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The development of essentialist reasoning about religion categories in Northern Ireland

Smyth, Kirsty

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The Development of Essentialist Reasoning about Religion Categories in Northern Ireland.

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Kirsty Christina Smyth, BSc

Supervisors: Dr. Aidan Feeney & Prof. Rhiannon Turner

School of Psychology

Abstract

Social essentialism refers to the overarching assumption that members of certain social categories share a common, objective underlying reality or essence. The belief in a category essence can lead individuals to view members of particular social categories as more similar to each other than they really are, as well as encouraging individuals to view membership of particular categories as naturally occurring, stable and innate. This can lead to stereotypical thinking about social categories, as well as prejudice and even discrimination.

Prior research has found that social/cultural context constrains the development of social essentialist reasoning; the most highly emphasised and socially meaningful dimensions stressed within a particular social or cultural context are usually the most strongly essentialised social dimensions. The present research is based on a case study of ethnic essentialism in Israel and aims to examine the development of social essentialist beliefs in a previously unexplored cultural context: the development of essentialist reasoning about ethno-religion categories (*Catholic* and *Protestant*) from 6-11 years of age within different educational contexts (*de facto* segregated and integrated schools) in Northern Ireland (NI). Based on the Israeli findings, it was expected that ethno-religion essentialism would be early-emerging within NI, it would decline in strength across childhood, and attendance at an integrated school would be associated with an earlier decline in ethno-religious essentialism.

This research consisted of a series of three inductive inference studies (Studies 1-3) measuring essentialist beliefs about the inductive potential of religion-, gender- and control categories in NI, one exploratory inference study examining essentialist reasoning about these categories in the United States (US) (Study 4), a questionnaire study examining children's endorsement of social essentialist beliefs (Study 5) in NI, and a meta-analysis of the NI studies contained within this thesis.

The main findings suggested that ethno-religious essentialism emerges at 8 years of age in NI, and the emergence of essentialist beliefs about the categories *Catholic* and *Protestant* is associated with attendance at a *de facto* segregated school. Exploratory inference data from the US showed a different pattern of reasoning from NI, with US children showing no increasing preference for religion categories across childhood. Different indices of social essentialism used in this research suggested that different aspects of essentialist thinking underpinned children's reasoning about religion and gender categories. Children appeared to essentialise ethno-religion categories more strongly along the dimension of entitativity, while they essentialised gender categories more strongly along the dimension of naturalness.

Future studies should expand the age range and demographics of the participants taking part in social essentialism research in NI. Research should examine how essentialist beliefs about religion categories are transmitted to young children in NI. Further research should also investigate essentialist reasoning as one potential cognitive source of stereotyping and ethno-religious prejudice in NI, with a view to exploring how challenging

essentialist beliefs about religion categories might be useful in forming the basis of a prejudice-reduction intervention, or in supporting current ongoing contact initiatives within NI.

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- P.S. You do not have to read this one!

Note

All of the research studies (and meta-analysis) detailed in this thesis were published in the paper:

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Chapter 1: Psychological Essentialism

1.1. Introduction: What is Essentialism?

In the movie '1408' based on the short story by Stephen King, the main character is asked at one point, "You do drink, don't you?", to which he replies, "Of course, I just said I was a writer" (di Bonaventura & Hafstrom, 2007). This response suggests that the protagonist has essentialist beliefs about that category 'writer'. By 'essentialist beliefs', I refer to the theory that individuals are biased towards the assumption that certain categories – such as dog, fish, man or writer – possess a deep underlying essence that makes members of those categories what they are (Gelman, 2003; Haslam, 1998; Medin & Ortony, 1989), and on which many of their properties depend.

According to Medin and Ortony (1989), the assumption of a category essence does not necessarily mean that people know what constitutes an essence; it can be a blank placeholder in people's concepts of categories. In other words, people just assume there is an underlying reality, glue or substance to certain categories that connects all of the entities in that category, without knowing what exactly the essence of, for example, being a writer, is. This kind of thinking is the subject of the research presented in this thesis.

Essentialism is a topic of great interest because, like many features of our cognitive architecture, an essentialist bias has both the potential to help us simplify the world around us and can lead to an erroneous way of thinking about the world. This is because the inherent assumption that certain categories have a natural, objective reality encourages the human inclination to engage in categorisation and to use categories to make inferences (see Murphy, 2002). This inclination is helpful when it comes to sorting and

gathering new information about the natural world (e.g., about plant or animals, see Gelman, 2003), but not when it is extended to reasoning about our social world (Haslam, 1998). When people treat particular social groups (e.g., Immigrants, Women, Conservative Voters, Writers) as having an objective, underlying reality, this supports inferences based on social category membership, which can lead to stereotyping of these groups, as well as prejudice (see, Dar-Nimrod & Heine, 2011; Diesendruck & Menahem, 2013; Leyens, Cortes, Demoulin, Dovidio, Fiske, Gaunt, Paladino, Rodriguez-Perez, Rodriguez-Torres & Vaes, 2003; Pauker, Ambady & Apfelbaum, 2010; Prentice & Miller, 2007). Thus, as one potential source of stereotyped thinking and prejudice, it is important to study the development of essentialist thinking about social categories. However, before doing so, the current chapter will provide a review of the literature on psychological essentialism, beginning with a more detailed discussion of essentialist beliefs in the next section.

1.1.1. Essentialist beliefs

With the assumption of a category essence comes a number of beliefs that people hold about essentialised categories. Assuming that categories have a shared essence permits inferences about other characteristics of the category, such as: the stability of category membership across time and superficial transformations, the existence of category boundaries that cannot be crossed, the heritability of category membership, and the similarity of category members, thus conferring stronger inductive potential of that

category (Gelman, 2003; Haslam, 1998; Medin & Ortony, 1989). Because there are a number of different aspects of essentialist thinking, there is no single way of measuring essentialism – research in this area focuses on each of the different types of beliefs when attempting to measure individuals' essentialisation of categories (Gelman, 2003).

Each of these beliefs have been used to measure the degree to which categories have been essentialised. Of particular interest is the belief that a shared essence makes category members similar, and in this way provides a strong basis for making category based inferences. Such inductive reasoning occurs when individuals use their prior knowledge to make predictions from the known to the unknown (Feeney & Heit, 2007; Goswami, 2011; Murphy, 2002). For example, if given a scenario in which an elephant suddenly presented symptoms of a previously unseen novel virus in elephants, individuals might be likely to infer that all other elephants may be equally susceptible to it – "elephant flu" – based on their knowledge that elephants share many other biological commonalities.

Research using category-based inference tasks has been one of the most common ways that essentialism has been studied in the literature on cognitive development (e.g., see Diesendruck & ha Levi, 2006; Gelman, 2003). The rationale for this work is that if an individual essentialises a category, such as 'dog', then information about shared category membership should be a stronger basis for inferring that two dogs share an unfamiliar property, even if one of them is perceptually more similar to a cat than a dog.

The study of essentialist reasoning about social categories is an important line of research because essentialism constitutes one cognitive source of stereotyping, prejudicial attitudes, and discrimination towards others (Bastian & Haslam, 2006; Bigler, Liben, 2007, Dar-Nimrod & Heine, 2011; Leyens, Demoulin, Vaes, Gaunt & Paladino 2007; Prentice & Miller, 2007). One consequence of social essentialism is that individuals tend to view certain social categories as more inherently and objectively real than others. Seeing the existence of certain social groups in this way (rather than as social constructs), can have pernicious consequences, such as the exacerbation of stereotyping, prejudice, discrimination, and even persecution (Bastian & Haslam, 2006; Dar-Nimrod & Heine, 2011; Keller, 2005; Morton, Haslam, Postmes and Hornsey, 2009). A real world example of essentialist beliefs in action would be Nazi ideology in the third Reich (for a review see, Evans, 2008), which spread the essentialist perception that members of the category 'Jew' were of a distinct and inferior race compared to other social groups.

Such essentialist reasoning about social categories is the focus of the subsequent research studies reported in this PhD thesis. Specifically, this thesis focuses on children's essentialist reasoning about such categories in Northern Ireland (NI) – a subject that has not previously been explored in the literature. Given this particular context, religion categories are the main categories of interest in this research. This first chapter of the literature review will discuss the different perspectives that scholars have taken on essentialism, before focusing on early work in this area on cognitive development, which examined children's essentialist reasoning about the

natural world and artifacts, as well as considering challenges that psychological essentialism has faced.

1.1.2. Theoretical underpinnings of essentialism

In this section of the literature review, I will discuss the various theoretical approaches towards essentialism that researchers in psychology have taken. However, in the interest of providing background to the concept, it should first be noted that the concept of essentialism has a longer tradition in philosophy and biological science than it does in psychology (see, Gelman, 2003; Haslam, 1998; McQueen & McQueen, 2010).

1.1.3. Background in Philosophy

Essentialism has a long tradition in philosophy and can be traced back to philosophers such as Aristotle (see discussion, Matthews, 1990) and Locke (Locke, 1689/1975) in their theorising about the nature of entities in the world. Essentialism received particular attention in the 1970s after Kripke (1980) and Putnam (1975) revisited Locke's (1979) assertion that an essence is the underlying structure of a thing that causes it to be what it is (what Locke termed '*real essence*'). Kripke (1980) and Putnam (1975; 1988) added to this definition, sparking new debates, by maintaining that it is possible to go beyond Locke's idea of a vague internal structure and actually discover the identity of a category's essence, due to modern scientific advancements (e.g., the discovery of DNA). They also treated the exact naming of things as an important issue, maintaining that a category name

should have the power to denote an entity and its properties in all possible worlds in which it could exist (i.e., a *nominal* and *sortal* view of essentialism).

Definitions of essentialism continue to be a central debate in philosophy; scholars argue about whether it is possible to know what an essence is (e.g., Kripke, 1980; Lowe, 2006; Putnam, 1975), and whether it is necessary for our understanding of categories to know what it is (e.g., Lowe, 2008; Naraniecki, 2014; Oderberg, 2007; Shalkowski, 2008). Another central concern in this literature is the question of which categories possess an essence and which do not (i.e., Ellis, 2001; Hare, 1979; Kripke, 1980; Lowe, 2006; Putnam 1975).

Scholars such as Lowe (2006), Kripke (1980) and Putnam (1975) believe that all classes of entities existing in the natural world (i.e., *natural kinds*[1]) possess an underlying essence, and some are even willing to extend this to social categories (e.g., Boyd, 1991; Pratten, 2012; van Brakel, 1998). Others such as Ellis (2001) are more conservative in their view and believe that category essences can only exist in the realms of chemistry and physics. This is because variation can be found within biological kinds (e.g., different types of birds), but changes to a chemical substance, such as H_2O, transforms it into an entirely different kind (Stalnaker, 1979).

Biological scientists have also taken this view (see, Mayr, 2001); many believe that the existence of a stable category essence is incompatible with

[1] To clarify, the term *'natural kinds'* in philosophy, biology and psychology refers to any living or non-living, biological entity that exists in the natural world – for example, a tiger, a tree, a rock, water (McQueen & McQueen, 2010). In other words, natural kinds exist independent of the human mind; natural categories are discovered by humans, not created by them.

Darwin's theory of evolution (Stalnaker, 1979), which posits continual change within species over time (others believe the two theories can be compatible if an essence is located in the behavioural properties of a species, not the genes, e.g., Devitt, 2008, Okasha, 2002; Sober, 1980).

With regards to the social realm, some anti-essentialist philosophers object to the view that social groups can possess an essence because (for reviews see, Mallon, 2007; Pratten, 2012) groupings of humans are an arbitrary phenomenon (e.g., Harre & Madden, 1975) while others object to the application of an essentialist lens to the social world because they maintain it is harmful to view social groups in this way (e.g., Stone, 2004).

Regardless of the position that various philosophers have taken on essentialism, the common themes running through their debates centre on the extent to which category essences really exist in the world, how useful it is for our understanding to think about categories in this way, and which categories it is sensible to view as possessing an essence. In contrast to essentialist philosophers, psychologists are unconcerned about the question of whether essences tangibly exist in the world; rather they are interested in people's belief that they do and the effect that this has on their reasoning and perception of the world (see Allport, 1954; Haslam, 1998; Medin & Ortony, 1989).

1.1.4. Emergence in Psychology

In psychology, essentialism was first alluded to by social psychologist, Gordon Allport (1954), in his seminal work '*The Nature of Prejudice'.* He pointed out how people often treat social categories as having an objective,

underlying reality. An example he used was treating membership in the category ‘Jew’ as conferring members with a unique ‘Jewishness’ or essence that makes those people inherently members of that category. The attribution of a category essence arises from the need for categorization; people need to create categories in order to reduce the complexity of the information about the world around them, and these categories support short-cuts in thinking, such as inductive inference.

Essentialism was alluded to again in 1989 by cognitive psychologists, Medin and Ortony (1989), who coined the term ‘psychological essentialism’. They used it to explain why individuals often privilege category information over perceptual similarity when judging the similarity of animals and non-living things in cognitive tasks. They maintained that when a category is strongly essentialised, individuals treat a shared essence as conferring greater similarity between two entities, than how similar they are in appearance.

This position emerged from the failure of traditional theories of categorization to explain why children and adults do not always categorize on the basis of perceptual similarity (see Murphy, 2002 for a review of traditional theories). Traditional theories were based on the assumption that categorization of an object is based on its perceptual, surface characteristics (i.e., the classical view, prototype theory, exemplar theory).

The main issue with the traditional theories of categorization is the idea of having a checklist of necessary perceptual features to use for categorization, as this does not explain how we form the concepts of categories that we have. For example, individuals distinguish between

flowers and weeds as separate categories, even though they are perceptually very similar – they have roots, stems, leaves, and some weeds even flower (e.g., Dandelion) – but we view them as conceptually distinct and this affects our actions; cultivating one and killing the other.

Furthermore, when dealing with an atypical instance of a category, such as an animal like a whale that looks more like a fish than a mammal, children and adults correctly categorize it as a mammal, overriding perceptual similarity (e.g., Gelman & Markman, 1986). This led to the emergence of the theory-based approach to categorization, which maintains that individuals do not rely only on surface features; they also have intuitive lay theories about what defines category membership, which guides their categorization and can be more salient than surface appearances (Medin, 1989).

This shift to a theory-based approach to categorization was influenced by the work of Susan Carey (1985). Carey's experiments on children's naïve biology were the first to suggest that children hold lay theories about the natural world. In her research, Carey (1985) explored how children aged 4 to 10 years of age, reason about biology by giving children an inference task, and examining their projections of novel or unfamiliar properties from humans to animals, and from animals to humans and other creatures (such as insects). The results were important because they showed that children were more willing to project from a human to other animals, than from animals to a human (with this tendency decreasing across childhood). It seemed that

children's reasoning centred around *'human'* as the prototype[2], even though a human and, for example, a dog, are both mammals and it would be reasonable to expect children to be as willing to project in either direction. This highlighted that children possess theories about the biological world, which inform their reasoning; it is not just adults who look beyond appearances. Cognitive developmental psychologists believe that when children begin categorizing and reasoning about the world, they are already equipped with an innate, essentialist bias towards viewing certain categories as possessing an objective reality (Gelman, 2003, Keil, 1989). In the next section, the possible origins of essentialist reasoning will be discussed further.

1.1.5. Underpinnings of Psychological Essentialism

A review of the psychological literature about the underpinnings of an essentialist mode of thinking reveals that there is no clear agreement between psychologists on what exactly essentialism is and how it arises (i.e., Cimpian & Salomon, 2014; Gelman, 2003; Keller, 2005; Bloom, 1996).

The earliest research exploring psychological essentialism emerged in the domain of natural kinds (e.g., Gelman, 2003, Keil, 1989), which lends itself well to essentialisation because natural categories - such as flower or tiger - have richly clustered, biological properties that invite the perception of

[2] However, it has since been shown that the 'human-as-prototype' phenomenon in young children's naïve biology can be specific to urban samples. The amount of exposure that children have to the natural world can influence their biological reasoning (e.g., see Medin, Waxman, Woodring & Washinawatok, 2010), with children living in rural areas, and being more exposed to nature, not displaying this bias.

a causal essence. Other kinds, such as artifacts, which are man-made and not richly structured, do not lend themselves so readily to essentialisation, but it has been found that people do also apply an essentialist framework to reasoning about artifacts (Barton & Komatsu, 1989; Bloom, 1996; Gelman, 1988; Keil 1989; Rothschild & Haslam, 2003). The difference between them is that the essence of a natural kind tends to be seen as something innate and biological in nature, while the essence of an artifact, such as a chair or a famous painting, tends to be conceptualised in terms of the artifact's function (e.g., Barton & Komatsu, 1989), the intention of the creator (e.g., Keil's, 1989, transformation of a coffee pot into a bird feeder), or the artifact's history (e.g., Bloom, 1996, an original Van Gogh is valued more than a replica). Further to this, research has extended the study of essentialist reasoning beyond these domains to include reasoning about personality traits (Gelman, Heyman & Legare, 2007) and social categories (Diesendruck & ha Levi, 2006; Rothschild & Haslam, 2003).

1.1.6. Cognitive psychology: Domain theories

In keeping with people's tendency to essentialise biological kinds more strongly than other domains, theorists, such as Gil-White (2001), Atran (1998) and Barrett (2001), propose that essentialism is the product of an evolved 'living-kinds' module in the brain, which causes people to attend to regularities among living things in their environment, and gradually extends to other domains in the mind. The adaptive function of this module is in supporting quick generalisations that could maximise the odds of survival – for example, Gil-White (2001) believes that the brain once processed racial

categories in the same way that it processed different species; to alert people to the fact that a newly encountered person or group is ‘different’ from them and may pose a threat.

Other theorists, such as Keil (1994) and Leslie (1994), propose that psychological essentialism is not as specific as this; rather than emerging in a domain-specific way, essentialism is a domain-general mode of thinking that comes to be invoked differently within various domains, such as in biology, artifacts, and social categories.

The main problem with these theories about the origins of essentialism is that they do not propose any mechanism as to how exactly an essentialist module or mode of thinking arises. However, other perspectives in cognitive psychology do describe such a mechanism.

1.1.7. Other cognitive perspectives

In her work, Gelman (2003) argued against a domain perspective, and proposed that psychological essentialism is the by-product of at least five other cognitive processes working in conjunction. These are: 1. The ability to distinguish between appearance and reality, leading to the search for nonobvious properties; 2. The tendency to make inductive inferences, thus assuming members of categories may share many commonalities; 3. The belief in causal determinism (that there is a cause for everything), leading to the search for causal properties; 4. Being able to track identity over time, which causes preoccupation with an entity’s origins; and 5. Deference to experts, leading to the acceptance of exceptions to the typical category ‘rules’, as well as the acceptance of labels and the influence of culture.

These cognitive processes translate into the different aspects of essentialist thinking, causing people to view certain aspects of the world through an essentialist lens. Gelman, Heyman and Legare (2007) explored the idea that essentialism is not a unitary construct, but is the result of different aspects of essentialist thinking converging across development. Gelman and colleagues conducted questionnaire studies with children and adults, exploring how different essentialist beliefs about psychological characteristics inter-correlate, and found that essentialist beliefs began to cohere at 9 years of age, and this was more pronounced in adulthood.

An alternative view to the idea that essentialism consists of a number of different strands of thought that converge over development, is the theory that essentialism evolves from a bias towards inherence based reasoning. Cimpian and colleagues (Cimpian, 2015; Cimpian & Salomon, 2014) have put forward this view in which they propose that children and adults possess an 'inherence heuristic', which biases them towards automatically searching for internal properties to explain a pattern. For example, girls like pink because they are female, and pink is a feminine colour.

The authors theorise that this focus on inherent explanations may be a precursor to psychological essentialism because it motivates children to search for non-obvious, causal properties, innate potential, heritability, stable boundaries and inductive potential in categories. To date, Cimpian and colleagues have explored this in research (i.e., Cimpian & Steinberg, 2014; Salomon & Cimpian, 2014) demonstrating children and adults' preferences for inherent explanations for patterns over external explanations, finding that

a preference for inherence based reasoning in adults predicted their endorsement of essentialist beliefs.

Similar to the theory that a preference for inherence based explanations may be the foundation of essentialist thinking, other theorists, such as Keller (2005) have claimed that beliefs in biological and social determinism (i.e., looking for inherent explanations, such as genes or culture) are the basis of essentialist reasoning about social categories.

1.1.8. Social psychology: Biological determinism, social determinism and strategic essentialism

Genetic (or biological) essentialism refers to the views advanced by Keller (2005) and Dar-Nimrod and Heine (2011) that psychological essentialism arises from people's belief in genetic determinism (BGD); that the essence of who we are is pre-programmed in our genes. This was later modified by Rangel and Keller (2011) to also include a belief in social determinism (BSD). Namely, it was proposed that BGD and BSD constitute two independent (but moderately correlated, see Rangel & Keller, 2011) dimensions that can lead (to varying degrees depending on the category and properties in question) to an essentialist perception of social categories.

Using a number of questionnaire studies with adults, Keller (2005) and Rangel and Keller (2011) showed that BGD and BSD were associated with the endorsement of essentialist beliefs, stereotyping, prejudice and discriminatory attitudes. Further to this, the authors also found that priming prejudice in adults who present as chronically prejudiced led to stronger essentialist beliefs and was associated with ideological motives, such as right

wing authoritarianism. Thus, Keller shows that the relationship between essentialist beliefs and prejudice can be bi-directional.

When this relationship has run from prejudice to the strategic endorsement of essentialist beliefs (i.e., endorsing essentialist beliefs in order to maintain the status quo when under threat, as demonstrated in studies by Morton, Haslam, Postmes & Hornsey, 2009; Morton, Hornsey & Postmes, 2009), it has been referred to as 'political essentialism' (Stoler, 1997) or 'strategic essentialism' (Morton et al., 2009a). Stoler (1997) called this 'political essentialism' because she viewed it as a deliberate attempt by members of groups to endorse a naturalised view of social categories in order to serve a particular agenda. When conducting research, it is important to be aware of the many different ways that researchers view essentialism because the perspective taken has implications for how it should be measured. In the next section, I look at another conceptualisation of essentialism that, like Keller's, also maintains there are two possible routes to perception through a social essentialist lens.

1.1.9. Social psychology: Naturalness and entitativity

Haslam, Rothschild and Ernst (2000) first provided empirical support for the theory (e.g., Rothbart & Taylor, 1992) that essentialism may not be a uni-dimensional construct. Haslam et al. conducted a questionnaire study, asking adults to rate 40 social categories along nine aspects of essentialist beliefs. They found that two main factors emerged, which they named 'natural kind-ness' (i.e., how natural, discrete and unalterable a category is)

and ‘reification’ or entitativity[3] (i.e., how entitative, unified, cohesive, homogeneous and informative a category is). In their ratings of the 40 social categories, participants treated categories that seem more biological in origin, such as gender and race, as more natural, while categories such as sexual orientation and religion groups where rated higher in entitativity. Demoulin, Leyens and Yzerbyt (2006) also found these two factors from their research, and further demonstrated that people tend to attribute ‘natural kind-ness’ to social categories that individuals are born into, while they attribute entitativity to social categories that individuals can choose to be members of.

These approaches show that essentialism is the result of more than one way of perceiving social categories. This is important to note because even though two categories - for example, gender and occupation - may be equally essentialised, one may be essentialised due to the perception of naturalness and the other may be essentialised due to the perception of similarity and cohesion. Furthermore, while researchers, such as Haslam and colleagues (2000), view essentialism as the result of naturalness or entitativity, others maintain that they are distinct concepts and essentialism is not necessarily the outcome (e.g., Hamilton, 2007; Hamilton, Sherman & Rodgers, 2004). In other words, some researchers believe that essentialist thinking can lead to the perception of entitativity or naturalness, and the perception of entitativity and naturalness can lead to increased essentialist thinking.

[3] Note that ‘entitativity’ is a term coined by Campbell (1958) to refer to the extent to which a social category is seen as a single entity; a unified, agentic and coherent whole.

1.1.10. Conclusion: Underpinnings of psychological essentialism

The main point highlighted in this section, exploring the possible underpinnings of psychological essentialism, is that there is no agreement between scholars on where essentialism comes from in the mind and how it comes to be applied so differently depending on the type of category reasoned about and the context that essentialist reasoning takes place in. Thus, it is important to consider how a researcher is defining essentialism and what aspects of it they claim to be measuring when examining research in the field. As the current thesis is concerned primarily with the development of childhood essentialism, the next section will review what is already known about essentialism in childhood.

1.2. Essentialism in children: Natural kinds

In this section, I will consider how children's essentialist reasoning about natural kinds and artifacts develop across childhood. Natural kinds and artifact categories have been the focus of the earliest developmental research on essentialism, with attention to social categories emerging later. For this reason, I will focus on natural kinds and artifacts here, and will review work on social categories in the next chapter. I will begin this section by looking at studies that have examined the inductive potential of essentialised categories for children. I will then move on to research examining beliefs about the immutability and stability of essentialised categories, and I will conclude this part of the review by discussing studies focusing on beliefs about the innate potential of essentialised categories.

1.2.1. Induction studies

This section of the review will discuss inference studies that have examined children's essentialist reasoning about natural and artifact kinds. In the literature, inductive inference has been treated as an index of essentialist reasoning, because research has found that essentialised categories are treated as a stronger basis for inference than categories that are not essentialised (see Gelman, 2003). Inductive inference can be a measure of the assumption that a common essence exists, causally linking all members of the same category, and making it more likely that category members share many other surface and non-obvious commonalities. Thus, membership in an essentialised category is treated as a more informative basis for inference than membership in a category that is not essentialised, or membership in a category that is essentialised to a lesser degree, (for example, artifact categories). This has been found by research examining essentialist reasoning about natural kinds in comparison to artifacts (Gelman, 2003). Natural kinds appear to be essentialised more than artifacts because natural kinds – such as tigers – are richly structured categories with a biological basis, while artifacts – such as a teapot – are man-made and do not have a rich cluster of inter-connected properties that would support as many strong inferences. The earliest induction studies with children examined artifacts, and natural kind categories - like animals, plants or minerals - which are assumed to have a biological basis and are discovered in nature (Gelman, 2003; McQueen & McQueen, 2010).

Gelman and Markman (1986; 1987) conducted studies with 4 year old children, examining how strongly they essentialise natural kinds by using a

forced choice task to pit information about an entity's category membership against conflicting perceptual information. For example, children were presented with a target picture and two test pictures. One test picture (for example, a flamingo) shared category membership with the target (for example, a blackbird) but was atypical in appearance, and one test picture (for example, a bat) did not share category membership with the target but was more similar to the target in surface appearance. Thus, children were forced to decide whether shared category membership (i.e., 'bird'), or similarity in surface appearance (i.e., small with wings), was more important in determining how likely it was that the target shares a property (e.g., 'feeds its babies mashed up food) with each of the two test pictures. The natural categories presented in this task were animate, for example, dolphins, or inanimate, for example, rocks. The rationale behind this task was that if young children essentialise natural categories then they would find shared category membership more informative than perceptual similarity when drawing inferences. Gelman and Markman (1986) found that children based their inferences on shared category membership rather than on surface appearance, 68% of the time, indicating that preschool children essentialise natural categories.

This research also demonstrated the importance of category labels in aiding children's inductive reasoning, with children responding at chance level when presented with no labels in the task or with coloured tabs. Further to this, the researchers were able to rule out a label-matching strategy and demonstrate that children's responses were based on the content of their categories when synonyms (e.g., rabbit and bunny) were used as labels

during the task. Gelman and Markman (1986) also showed that the four year old children were capable of making sensible inferences about the categories they were presented with as they responded at chance when category membership and surface appearance had no link to the properties in question (for example, the property they were invited to project was the weight of the target animal). Thus, children demonstrated that they consider whether properties are projectable or not when they make inferences.

Gelman and Markman (1987) pursued this research further by extending their findings to 3 year old preschool children, in addition to the 4 year olds. Their aim was to pin-point the age when children begin treating membership in natural kinds as indicative of deeper commonalities by examining a younger age group, which was possible by reducing the cognitive demands using a simpler task. They replaced the forced choice triads by presenting children with one target picture and four test pictures, and inviting children to make an inference from the target to each of the four test pictures in turn, rather than asking them to choose between two competing test pictures when deciding whether to draw an inference. Each test picture varied by how similar it was to the target. For example, if the target was brown sugar, one test picture would be exactly the same (e.g., brown sugar), one would be similar in category but not appearance (e.g., sugar cubes), one would be similar in appearance but not category (e.g., brown sand), and one test picture would be completely dissimilar (e.g., wood). Children were invited to project a property from the target (e.g., 'melts in water') to each test picture one at a time; so children had the opportunity to project the property from the target to all four test pictures if

they wished to do so. Thus, this task measured children's absolute rather than their relative level of inference.

The essentialist findings of Gelman and Markman (1986) were replicated. Four year old children still chose to make more category based inferences (60%) than appearance based inferences (22%), even when they did not have to choose between competing test information. Furthermore, this finding extended to 3 year olds (i.e., category-based inferences were made 67% of the time). In addition, when children were given labels without pictures they based most of their inferences on category membership, but when given pictures with no labels children made more inferences based on appearances than category information, more so for inanimate natural kinds than for animals. This may have been because they were able to determine the category membership of animals from the pictures alone, and used surface appearances when presented with inanimate natural kinds whose identity may have been harder to discern. These studies by Gelman and Markman (1986; 1987) showed thoroughly that children as young as three years of age have an essentialist bias when reasoning about the natural world.

Gelman and Coley (1990) extended these findings further to two-and-a-half year olds, using the same type of task as Gelman and Markman (1987) that removed the necessity of a forced choice. The results of the task demonstrated that children as young as two and a half years old essentialise category membership, even when the category items they are essentialising are unfamiliar or atypical (e.g., a dodo as an atypical and unfamiliar bird). Of particular interest in this paper, Gelman and Coley (1990) analysed each

child's individual pattern of responses and classified them as particular responders: category based, appearance based, inconsistent, or response biased. This analysis revealed that 6 out 11 children in the label condition were category based responders, 0 were appearance based responders, 3 exhibited a response bias, and 2 were inconsistent. This indicates that two-and-a-half years of age is the lowest age limit in which children can be tested in this way, because when presented with labels, approximately half the children (5/11) do not reliably favour category information, indicating they do not consistently essentialise natural categories.

A number of other studies have also been conducted by Gelman (i.e., see, Gelman, 1988; 1989; 2003; 2013; Gelman & O'Reilly, 1988) examining children's stronger essentialist reasoning about natural kinds in comparison to artifacts, how projectable different types of properties are to children, and the levels of categorisation that children prefer (i.e subordinate, basic or superordinate level). These studies of early category based induction show that children have many constraints that guide them towards making appropriate and sensible inferences about the world (Gelman, 1988b). Research has shown that children are not solely driven by similarity of surface appearances when making categorization judgements, but look for deeper commonalities (i.e., Gelman, 2003; Medin, 1989). It has also shown that category labels play an important role in children's category based inductions (e.g., Gelman & Markman, 1986); children make more category based inferences in the presence of labels than without. Labels promote inferences most at the basic level, and their role is not in aiding 'picture matching' but is more likely to be in helping children access their category

information, as shown by children's continued bias towards category based induction when items are not given identical labels, for example, 'bunny' and 'rabbit' (i.e., Gelman & Markman, 1986). Thus, young children are not just captured by perceptual similarity, their inferences are also guided by the strength of their essentialist beliefs about natural categories (and to a lesser extent – artifact categories). As the next section will show, studies of category based induction are not the only evidence of essentialism that has been found in childhood.

1.2.2. Transformation studies

In this part of the review I will discuss research that has focused on children's essentialist reasoning about the stability and immutability of category boundaries. Research about the essentialisation of natural kinds and artifacts has used transformation studies to examine essentialist beliefs about category boundaries (Gelman, 2003; Keil, 1989) (as well as using essentialism questionnaires with children, e.g., Diesendruck & Haber, 2009 – discussed in the next chapter due to its inclusion of social categories with natural kinds). Frank Keil (1989) conducted a number of studies in this area, presenting children with scenarios involving a natural kind or artifact that undergoes a physical transformation, at a superficial level or a deeper biological level, and children were then asked to decide what the category membership of the animal was. For example, a racoon that is superficially transformed into a skunk by: shaving and dying its fur, or by shaving it, dying it, and surgically implanting a smelly sac inside it, or by injecting an animal with the wrong medicine when it was a baby. After presenting children with a

transformation, they then had to decide if the animal was a racoon or a skunk. An example of an artifact transformation was altering a coffee pot to turn it into a bird feeder.

Keil (1989) found that when physical alterations were made to natural kinds - such as dying fur or performing surgery on an animal – 7 year old children and 9 year old children maintained that the essence of the animal had not changed and it retained its original category membership, with the strength of this conviction increasing between 7 and 9 years of age. On the other-hand, the youngest children at 5 years of age did not appear to essentialise natural kinds and were willing to say that an animal's category membership had changed. This finding contrasts with the results of the inference studies previously described, indicating that children are strong essentialists at 5 years of age. However, it is possible that different tasks aimed at measuring different aspects of essentialist reasoning would have different results, particularly when testing young children whose lay theories about biology and essentialism are continuing to develop. As Gelman et al. (2007) showed, various strands of essentialist reasoning about personality traits do not appear to form a coherent construct before 9 years of age. Furthermore, essentialist reasoning in adulthood is not a unitary construct either, but is comprised of two factors (Haslam et al., 2000).

Keil (1989) explored further by developing scenarios that might be more sensitive to the developing theories of young children, and therefore able to reveal more subtle signs that 5 year olds believe categories have a fixed essence, using this type of task. Keil (1989) theorised that younger children may have difficulty deciding which properties are central to a

category essence due to their lack of biological knowledge and so deem superficial and deeper changes to an animals properties as plausibly changing its categorisation. To make the task easier, Keil presented children with additional scenarios in which an animal's superficial and deeper properties were not altered, but instead the animal was said to be wearing a costume. For example, a zebra wearing a horse costume, or a finch wearing a blue-bird costume. When asked whether category membership had changed, all children, including the 5 year olds, showed essentialist reasoning by judging the animals' category membership to have remained the same.

Keil (1989) was also able to demonstrate essentialist reasoning about category boundaries with 5 year olds when he asked them to judge transformations that crossed ontological category boundaries. For example, transforming a toy bird into a real bird by giving it feathers and a beak, and doing an operation to put a machine inside it to make it chirp and fly. All children resisted the idea that the toy bird had become a real bird. Keil interpreted this as evidence that 5 year old children are not simply basing their beliefs on surface characteristics. The fact that they essentialised category membership at the ontological level suggests that children as young as 5 years do possess some intuition about biological categories that prevents them from viewing transformations across ontological boundaries as possible.

This is an important finding because it indicates that developmental changes in children's reasoning about the immutability and stability of category membership is not simply a change from perceptual reasoning to

the development of deeper reasoning about the nature of categories. The beginnings of essentialist reasoning about category boundaries are present at 5 years of age in their thinking. With regards to artifact categories, all three age groups reported that transformations to objects changed their category membership. This does not necessarily mean that children did not view artifacts as containing an essence, rather it may indicate that children viewed the intention of the creator in transforming the object into something else to be the essence of the object. Therefore, if a person wants to use a coffee pot as a bird feeder, then the coffee pot becomes a bird feeder.

This collection of experiments conducted by Keil (1989) suggests that 5 year olds do have intuitive theories about the biological world, but at this age they do not have a fully developed theory about which properties are central and causally related to the essence of biological categories. This may be responsible for impeding the development of 5 year old children's essentialist beliefs about the discreteness and inalterability of category membership for natural kinds. Overall, the developmental studies conducted by Keil (1989) were important in demonstrating that essentialist beliefs about the immutability and stability of natural kinds in transformation scenarios are clearly evident by 7 years of age, and become stronger by 9 years of age.

In addition to Keil's (1989) seminal work, Gelman and Wellman (1991) also examined children's reasoning about the nature of categories when they investigated how well 3-5 year olds understand that there can be a huge difference between surface appearance and reality; an important ability for understanding transformation scenarios. Gelman and Wellman (1991) found that preschool children were able to correctly distinguish between surface

appearance and insides - judging an orange balloon as similar in appearance to an orange, and judging a lemon as internally similar to an orange. This distinction was more pronounced for 4 year olds than 3 year olds, and similar to the findings of Gelman and Markman (1986; 1987) and Keil's (1989) costume scenario, demonstrates that young children understand that discrepancies between appearance and reality can exist.

As well as this, Gelman and Wellman (1991) also presented pre-schoolers with transformation scenarios different to those presented by Keil, in which 4 and 5 year olds were asked to judge whether an entity had changed category membership, without having to determine what it had changed into. For example, children were presented with a picture of a dog and were told that its fur was removed, or its insides were removed. Children were asked whether the animal was still a dog, and whether it could bark. This study found that children privileged insides, judging the identity, function or behaviour of a dog as changed if its insides were removed, but not when the outsides were removed (moreover, for artifacts such as a fridge, children correctly judged that a fridge is not changed by removing food from it).

This research is significant because it showed that 4-5 year old children are capable of giving stronger essentialist responses when reasoning about category boundaries than Keil (1989) thought. Gelman and Wellman (1991) found that preschool children judged superficial transformations to an animal, such as removing fur, to be non-essential to category membership, while preschool children in Keil's studies judged superficial transformations (but not a 'costume') as having the potential to alter category membership. Thus, when presented with a transformation that

did not require children to judge what the new category membership of an entity was, young children showed stronger evidence of essentialist reasoning.

In the following section, I will now turn to another index of essentialist thinking – children's essentialist reasoning about the heritability and innate potential of membership in natural categories.

1.2.3. Innate potential and heritability studies

In the final part of this section on essentialism in childhood, I will discuss a series of experiments displaying evidence that young children treat membership in a natural category as heritable, and they treat category membership as predictive of certain properties that are inherent to category group membership (for example, a Dalmatian puppy is not born with spots, it develops them over time). This belief that category membership is innate is another major aspect of essentialist reasoning.

Gelman and Wellman (1991) investigated children's reasoning about the heritability and innate potential of category membership in natural kinds. Children aged 4 and 5 years were presented with 'switched at birth' scenarios, requiring them to consider how an animal would develop if it was raised by animals with membership in a different category - for example, a kangaroo raised by goats. Children were asked to identify the animals and consider what physical and behavioural characteristics the baby animal would develop over time - for example, would the infant kangaroo have a pouch or no pouch when it grew up, and would it hop or be good at climbing.

Children, therefore, had to decide whether the animal's original category membership would determine its physical and behavioural characteristics, or whether the infant's environment and 'adoptive parents' had the potential to change these. The results showed that 4 and 5 year old children held essentialist beliefs about the heritability and innate potential of category membership in this research - children believed that a baby kangaroo would grow up to have a pouch and hop, even if it was raised by goats.

In further tasks exploring children's understanding of innate potential, Gelman and Wellman (1991) presented children with only pictures of infant animals and asked them what physical and behavioural characteristics the baby animal would have. The aim of this task was to provide evidence that children essentialise natural categories by examining whether children realise that as an infant, an animal does not possess all of the characteristics that it would have as an adult. This would show that children in the previous study were not simply reporting the characteristics that they knew were associated with a category label, such as 'cow'.

The results showed that 4 and 5 year old children believed that a baby animal would possess the behavioural characteristics of its kind in infancy (for example, a cow goes 'moo') 87% of the time, while physical characteristics of its kind (for example, a cow has a straight tail) were attributed 40% of the time. This lower endorsement of physical traits in comparison to behavioural traits (and in comparison to the children's higher endorsement of physical traits for adult animals, i.e., 67%) is interesting, as it indicates that children realise that there are significant differences between an infant animal and a mature animal, while also showing that children hold

essentialist beliefs about heritability and innate potential. This result was further supported by control questions about characteristics that all animals would have (such as eyes) and characteristics that it would be impossible for a particular animal to ever have (such as fins, if reasoning about a cow or a kangaroo). Children responded to the control questions correctly, showing that 4 and 5 year olds were not employing a strategy of describing characteristics they associated with category labels, rather they demonstrated an understanding that an animal's category membership confers the innate potential to one day develop all of the characteristics essential to its kind.

The final study conducted in this series of experiments examined children's essentialist reasoning about the innate potential of seeds. Gelman and Wellman (1991) carried out this experiment to provide further support for their assertion that children do not just report characteristics associated with a category label in these studies. To do this, the authors presented children with scenarios in which the initial state of an entity (e.g., a seed) was extremely different in appearance and in its label from the end state once it reached maturity (e.g., a tree). Children were presented with 'switched-at-birth' scenarios in which the seed from one plant or fruit was planted alongside different seeds in a pot – for example, seeds from an apple planted in a flower pot. It was found that older 4 year old children responded in an essentialist manner, correctly predicting that the seed would grow into an apple tree if planted with flower seeds. However, some of the younger 4 year olds had more difficulty with this task, with 5 out of 12 children making incorrect responses and 7 out 12 children responding in an essentialist

manner on the basis of innate potential. Despite the increased difficulty that some of the younger 4 year olds had with this study, overall, it provided a stronger test of preschool children's essentialist reasoning about the innate potential of natural kinds.

To conclude this section, the key studies of early childhood essentialism reviewed in this chapter show that young children exhibit an essentialist bias in their reasoning about certain types of categories (i.e., natural kinds and artifacts). As essentialist beliefs cannot be measured directly, obtaining evidence of essentialist beliefs is dependent on experiments being sensitive enough to tap into these beliefs in very young children. The evidence so far suggests that children of at least 4 years of age (if not younger in some cases, i.e., Gelman & Coley, 1990), are guided by an essentialist framework in their reasoning about natural categories. Studies examining beliefs about inductive potential, the immutability and stability of category boundaries, and heritability and innate potential, have provided an index of essentialism in childhood. Moving on to the last section in this chapter of the literature review, I will discuss criticisms that have been faced by essentialism, before the second chapter which will focus on social essentialism in childhood.

1.3. Challenges to Psychological essentialism

1.3.1. Feature-Based Categorization and Induction

Like any area of research, studies of psychological essentialism have not existed without criticism. The main challenge that psychological essentialism in childhood has faced has come from proponents of feature-

based categorization and induction, Vladimir Sloutsky and colleagues (e.g., Sloutsky, 2003; Sloutsky & Lo, 1999; Sloutsky, Lo & Fisher, 2001; Godwin & Fisher, 2015), who maintain that children are not capable of category-based induction until at least 7 years of age. Thus, an innate, essentialist bias does not operate on children's reasoning in early childhood and, according to Sloutsky and colleagues, does not exist at all (see Sloutsky, 2003; Sloutsky & Lo, 1999; Sloutsky, et al., 2001). Instead the authors proposed that children perform induction using the perceptual features of an object or entity, and that labels contribute to the perception of similarity because of their auditory properties rather than because of their semantic properties. In a number of studies, Sloutsky et al. claim to show that children do not perform category based induction until at least 7, if not 9, years of age, but rely on perceptual similarity when making generalisations (i.e., Fisher & Sloutsky, 2005; Sloutsky & Fisher, 2004a; 2004b; 2012; Sloutsky, Kloos & Fisher, 2007; Sloutsky & Lo, 1999; Sloutsky et al., 2001).

However, there are a number of issues with the experiments that Sloutsky and colleagues cite as evidence that young children do not essentialise categories. The stimuli that Sloutsky et al. used in their inference studies are either artificial categories (e.g., an alien called 'Bala', a creature called a 'flurp') (Sloutsky & Lo, 1999; Sloutsky et al., 2001; Sloutsky et al., 2007) or novel pictures featuring two animals that have been morphed together and given novel (e.g., 'lolo', 'tippy') or familiar labels (e.g., cat or dog) (Sloutsky et al., 2001; Sloutsky & Fisher, 2012). As the entities that children were presented with had no conceptual grounding or richly clustered properties like a natural kind would, it seems reasonable that 4-5 year old

children would attend to the perceptual properties of the stimuli - especially in a situation where, for example, a bunch of grapes or a dog is given a novel label that conflicts with children's existing knowledge, or when pictures of a cat and a dog have been morphed together and presented to children with familiar labels that conflict with what they are seeing.

Moreover, Noles and Gelman (2012b) showed that the order in which 4 year old children were presented with the stimuli in these triads elicited different patterns of responding. When children were presented with three pictures that were identical in appearance, but only two shared the same label (as Sloutsky et al. have), children rely on label matching rather than visual information in induction because it seems they are unsure what to focus their attention on. When they are not presented with a triad of identical pictures to begin with, they rely on the similarity between visual features rather than the label in induction. This study would suggest that children find the stimuli presented by Sloutsky and colleagues confusing, and adopt a strategy of attending to whichever aspect of the stimuli their attention has been focused on.

Further to this, the claim by Sloutsky and colleagues that labels possess greater perceptual weight than a single visual feature for children (see Sloutsky & Napolitano, 2003; 2004) was challenged by Noles and Gelman (2012a). Noles and Gelman showed that there were issues with Sloutsky et al.'s studies of auditory dominance. Mainly, Noles and Gelman suggested that children's preference for auditory cues over visual stimuli was caused by the visual stimuli being more complex to process than the auditory

tones (e.g., children were presented with pictures of landscapes, Sloutsky & Napolitano, 2004). By presenting children with shapes that only varied by colour depth, and tones that only varied in pitch, Noles and Gelman showed that children preferred visual information, and auditory information was attended to more when the visual stimuli was more difficult to discriminate between (i.e., the shapes were almost the same colour depth).

In addition to this, Wilburn and Feeney (2008) also found evidence that contradicts Sloutsky and colleagues claims that children younger than 7 years of age do not perform category based induction. Sloutsky and Fisher (see Fisher & Sloutsky, 2005; Sloutsky & Fisher, 2004b) conducted tests of children's recognition memory for stimuli following categorization and induction tasks, and interpreted children's more accurate recognition of stimuli they had been presented with, in comparison to adults, as evidence that children attend to perceptual features more closely than adults as a result of feature-based induction. However, Wilburn and Feeney (2008) demonstrated that children's better recognition memory was due to their tendency to spend longer looking at the pictures, and that when a time limit of 250ms was placed on both children and adults' exposure to the stimuli, children's recognition accuracy dropped to the level of adults', but their reasoning accuracy was unimpaired.

Given the challenges that Sloutsky and colleagues (see also, Gelman & Davidson, 2013; Noles & Danovitch, 2015) have faced in providing evidence to support their model of feature-based induction in early childhood - as well as the implausibility of claims that children perform bottom-up induction without activating conceptual knowledge, or perform top-down

induction without also considering perceptual features - the authors have now amended their model (i.e., Fisher, Godwin & Matlen, 2015a; Fisher, Godwin, Matlen & Unger, 2015b; Godwin & Fisher, 2015) to incorporate the use of semantic knowledge in the induction process.

1.3.2. Other knowledge-based approaches.

Fisher, Sloutsky and colleagues (Fisher et al., 2015a; 2015b; Godwin & Fisher, 2015; Sloutsky, Deng, Fisher & Kloos, 2015) have recently proposed a new model of induction in which perceptual features and semantic knowledge both operate on children's generalisations. Fisher et al. propose that induction in early childhood is based on perceptual features, but over the course of development these features become organised into taxonomies that are also available to children when they make generalisations. The authors call this representational similarity, in which children are able to compare the features of an entity to exemplars that they have stored in memory, and this gives rise to inferences that appear to be category-based, but in reality induction is still based on comparing perceptual features to others stored in semantic memory, which are activated by the category label. Fisher and colleagues (Fisher et al., 2015a; 2015b; Godwin & Fisher, 2015; Sloutsky, Deng, Fisher & Kloos, 2015) still claim to show that it is not until 7 years of age that children's inferences are truly category-based, as by this age they have fully established taxonomic relations between categories, which can only happen once children have built category knowledge through direct experience with categories, or indirectly through books, television, or other such mediums.

This model is quite similar to Sloman's (1993) feature-based model of induction, which proposes that semantic knowledge is retrieved from memory during induction, and this knowledge involves not only physical features (e.g., has a beak and wings), but also other types of features, such as information about habitat and diet (e.g., lives in a nest and eats worms). It is also not unlike Osherson's (Osherson, Smith, Wilkie, Lopez & Shafir, 1990) similarity-coverage model, which proposes that induction is the result of comparing the perceptual similarities between two entities, as well as retrieving semantic knowledge about categories in an effort to find a category that they both can be sufficiently grouped by. Thus, Fisher and colleagues do not seem to contribute anything new with their model that previous authors have not already proposed.

Furthermore, while the development of children's category knowledge and level of expertise (via direct experience with natural kinds and objects, as well as indirectly through schooling and television etc) undoubtedly has an impact on their reasoning about categories (e.g., differences in children's reasoning about biology depending on whether they live in urban or rural areas of the US, i.e., Medin et al., 2010, or between different cultures, i.e., Lopez, Atran, Coley, Medin & Smith, 1997) as the above models suggest, the development of taxonomies and semantic knowledge still does not explain why children are clearly motivated to acquire category knowledge (see Cimpian, 2016; Greif, Kelmer-Nelson, Keil & Gutierrez, 2006) and use categories from as young as 2 years of age (Gelman, 2003; Graham, Nayer & Gelman, 2011).

Studies examining generic language production (i.e., noun phrases that refer to categories or kinds as a whole) in early childhood show that children as young as 2 years of age universally produce generic language both spontaneously (e.g., Gelman, Goetz, Sarnecka & Flukes, 2008; Goldin-Meadow, Gelman & Mylander, 2005; Pappas & Gelman, 1998) and in discussions led by their parents about toys or story books, and they produce more generic language – and generic questions (i.e., Gelman et al., 2008) - about animals than artifacts. This shows that children have the ability to reason about categories in the abstract well before 7 years of age, and it also shows that children are motivated to learn about categories - particularly natural kinds.

In addition to this, studies by Cimpian and colleagues (e.g., Cimpian & Erikson, 2012; Sutherland, Cimpian, Leslie & Gelman, 2015) found that young children have a superior memory for category information that has been presented to them using generic language, suggesting that they are more interested in attending to information that is presented to them as referring to an entire category compared to an individual. Research by Gelman, Rhodes and colleagues has also demonstrated a link between generic language production and essentialist beliefs (e.g., Cimpian & Markman, 2011; Gelman & Heyman, 1999; Rhodes, Leslie & Tworek, 2012), showing that the presentation of generic information about categories either leads to or exacerbates essentialist beliefs about categories, and holding essentialist beliefs about categories leads to the production of more generic language about them.

Another alternative to psychological essentialism that has been put forward is Strevens' (2000) minimal hypothesis. Strevens put forward the idea that children's category-based responses in Gelman's induction studies (e.g., Gelman & Markman, 1986; 1987) and Keil's transformation studies (mostly 7 years of age plus, Keil, 1989) are not the product of an essentialist bias but the result of children attending to K-Laws, which are causal links that children track between natural kinds and their observable properties (e.g., tigers have stripes and claws, and they roar – and these properties are causally related to being a tiger). This is quite similar to computational models of categorization and induction (e.g., McClleland & Rogers, 2003), which maintain that categories are formed by tracking and storing information about the statistical regularities observed between a category and its properties (and between categories within taxonomies), and also has the same issue of how children decide which properties are central to category membership and which are not if there is no proposed mechanism of constraint - such as the assumption of a category essence that some properties, but not others, are causally related to (i.e., Medin & Ortony, 1989).

In addition to Strevens' (2000) minimal hypothesis lacking a mechanism of constraint, it also does not account for children's essentialisation of categories that are not natural kinds, such as artifacts (which are essentialised by their intended function rather than their physical properties, e.g., Gelman, 2003; Gelman & Bloom, 2000; Keil, 1989) and personal belongings (e.g., a child's teddy bear), or the belongings of a celebrity, which possess no rational basis for holding more value than similar

objects not owned by a celebrity (e.g., Gelman, 2013; Gelman, Frazier, Noles, Manczak & Stillwell, 2015). It is possible that K-Laws, and similarly the inherence heuristic (i.e., Cimpian & Salomon, 2014), may be precursors to essentialist reasoning. It has been demonstrated that psychological essentialism is not a uni-dimensional construct (e.g., Haslam et al., 2000), but consists of a number of interrelated strands of thought, which form at least two main underlying dimensions. It has also been theorised that an essentialist bias may emerge in childhood due to the convergence of a number of different cognitive abilities across development (i.e., Gelman, 2003) that do not seem to fully cohere until about 9 years of age (Gelman et al., 2007). Thus, K-Laws and the inherence heuristic may represent two of the mechanisms by which an essentialist bias begins to emerge in early childhood, and correspond to essentialist beliefs about natural kinds possessing a rich cluster of causally related properties, as well as beliefs about the innate potential of category membership and the intuition that not all meaningful category properties are directly observable.

In conclusion to this section, the developmental literature clearly shows that children engage in category based reasoning before the age of 7, and in some cases are capable of doing so from as early as 2-3 years of age (e.g., Gelman & Coley, 1990; Gelman & Markman, 1987; Graham et al., 2011). Children pay particular attention to category information (e.g., Gelman et al., 2008) and as this tendency emerges early in childhood, this would suggest that children are driven by an early emerging bias to acquire category knowledge and use categories in their reasoning. It seems likely that children use both perceptual features and conceptual knowledge when

performing categorization and induction, as perceptual features are usually not at odds with category membership. It remains to be seen how future research in this area will determine under which conditions children largely prefer the feature-based or category-based route to induction.

1.4. Conclusion

In conclusion, this chapter on psychological essentialism has discussed the emergence of the concept of essentialism within psychology and it has looked at the evidence suggesting that an essentialist bias operates on children's reasoning early in childhood. The research has shown that by at least 4 years of age, children hold essentialist beliefs about natural kinds and artifacts (Gelman, 2003), and this has been demonstrated by studies of the inductive potential of categories, the stability of categories, and the innate potential and heritability of categories. Having reviewed the developmental literature on essentialist reasoning about natural kind and artifact categories, the next chapter in this thesis will now turn to the literature examining the development of essentialist reasoning about social categories in childhood.

Chapter 2: Social Essentialism

2.1. Introduction

This chapter focuses on the development of social essentialism in childhood. As the previous chapter showed, young children display evidence of essentialist reasoning about natural kinds and artifact categories from at least 4 years of age on a variety of tasks (Gelman, 2003). From this research, interest has grown in how children might apply an essentialist framework to reasoning about social categories across development (e.g., Birnbaum, Deeb, Segall, Ben-Eliyahu & Diesendruck, 2010; Hirschfeld, 1995; 1996; Taylor, 1996). This is because it constitutes one possible cognitive source of stereotyping and prejudice, as a number of adult studies (i.e., Leyens et al., 2003; Prentice & Miller, 2007), and more recently child studies (Diesendruck & Menahem, 2013; Pauker et al., 2010; Pauker, Xu, Williams & Biddle, 2016; Segall et al., 2015), have found. The aim of this chapter is to review developmental studies of social essentialism and outline the rationale for exploring the developmental of social essentialism in Northern Ireland.

2.2. Essentialised social categories: Developmental studies

A number of studies have found that children essentialise a range of social categories, including gender, race and ethnicity (e.g., Diesendruck & ha Levi, 2006; Gelman, Colman & Maccoby, 1986; Hirschfeld, 1995; 1996; Taylor, 1996). However, unlike the pattern of an early emerging essentialist bias that is found in young children's reasoning about natural kinds (Gelman, 2003), essentialist reasoning about social categories varies widely across different cultural and social contexts (e.g., Diesendruck, Goldfein-Elbaz et al., 2013; Rhodes & Gelman, 2009). The reason for this may be because researchers

have used different tasks to measure essentialism, so there has been no standardisation in the approaches that scholars have taken across cultural contexts (e.g., del Rio & Strasser, 2011; Kim, 2013). On the other hand, it may reflect the impact that different cultural input can have on the development of children's reasoning about particular social categories (Kinzler, Shutts & Correll, 2010). The next section of this review will discuss these early studies of social essentialism in childhood, followed by more recent work in this area.

2.2.1. Early studies

One of the earliest studies of social essentialism was conducted by Gelman, Collman & Maccoby (1986), who examined the gender-based inferences of 4-5 and 7-9 year old children. Using a forced choice inference task, children were presented with a target picture (e.g., a male with long hair) that shared gender category membership with one test picture (e.g., a male with short hair), but was perceptually more similar to another test picture (e.g., a girl with long hair). Children were asked to project a novel biological property (e.g., has *andro* in their blood) from the target to one of the two test pictures. It was found that 4-9 year old children showed evidence of essentialist thinking about gender categories; they preferred to draw inferences on the basis of shared gender category membership rather than on the basis of similar physical appearance.

Further to this, Taylor (1996) examined children's essentialist beliefs about the innate potential and heritability of gender category membership. Children aged 4-10 years participated in a switched-at-birth task, in which

they were presented with scenarios about a male or female infant being raised in isolation by members of the same or opposite gender. Essentialist beliefs were probed by asking children to consider what physical properties (e.g., 'has a boy's body', or 'grows up to be a mommy') and behavioural properties (e.g., 'likes to play with dolls', 'likes to play football', 'has short hair') they would expect the infant to display when they reach 10 years of age.

Results showed that all children held essentialist beliefs about the biological properties of gender; regardless of the environment that the infants were raised in, it was deemed that infants would possess the biological properties consistent with their gender. In contrast, children did not essentialise the behavioural properties associated with gender at 4 and 10 years of age; they treated properties such as toy and clothing preferences as flexible and dependent on the environment that the infants were raised in. Meanwhile, 5 and 8 year olds essentialised the behavioural properties typically associated with gender by treating them as determined by gender category membership. These results would suggest an increase in children's tendency to essentialise gender group membership across middle childhood, followed by a decline at 9-10 years of age. A more recent replication by Taylor, Rhodes and Gelman (2009) also showed that 5-6 year olds essentialise the biological and behavioural properties of gender, while 10 year olds showed more flexibility in treating the behavioural properties associated with gender as amenable to environmental influence. Thus, these studies by Taylor and colleagues highlight children's tendency to treat gender and its associated properties as highly natural.

Another noteworthy study of social essentialism in the early literature is Hirschfeld's (1995; 1996) studies of race. In a number of studies Hirschfeld (1995; 1996) examined children's judgements about the salience, innate potential and the heritability of racial categories in comparison to occupation and body build. In this research, 3-7 year old children were presented with forced choice scenarios in which two test pictures each shared membership of a different category with a target picture (e.g., a child that was white and of large body build, a child that was black and of small body build, and a target picture of an adult who was white and of small body build). Depending on the condition that children were in, they were asked to decide: which test picture was most similar to the target picture, which test picture was the adult when they were a child (examining stability), or which test picture was the child *of* the adult (examining heritability). Moreover, children were given switched-at-birth scenarios in which a child of one race had been raised by parents of a different race and children were asked to identify how the child would look at 10 years of age using test pictures (examining innate potential). The findings demonstrated that 3-7 year old children in these studies treated race as more salient, stable, heritable and innate than occupation or body build.

The pattern that these early studies show is one of an early emerging bias towards the essentialisation of gender and race, which seems to be strong across early and middle childhood. However, one issue with this picture is that these studies were all conducted with children in the USA with regards to reasoning about gender and race, and so this research only provides evidence of social essentialism about these categories in American

children. As interest in other social categories in a wider range of social and cultural contexts has grown, the emerging picture of the development of social essentialism is more complex than it initially appeared. The following section will examine more recent research in this field.

2.2.2. More Recent Research

A number of studies around the globe have now examined essentialist thinking about social categories. This literature is narrow in scope, lacks standardisation in methodological approach across different contexts (e.g., Diesendruck & ha Levi, 2006; Rhodes & Gelman, 2009), and to begin with was mostly conducted with adult participants. While the current section focuses on the growing number of studies that have now been conducted with children in different cultural contexts, it is first worth mentioning that adult studies have documented strong essentialist reasoning about a number of social categories across different contexts. For example, strong ethnic essentialism has been found among adults in Mongolia (Gil-White, 2001) and adults in Japan (Tsukamoto, Enright & Karasawa, 2013). Ethnic and gender essentialism have been found among adults in Australia (Keller, 2005; Morton et al., 2009a; 2009b) and India (Mahalingam, 2003; Mahalingam, Haritatos & Jackson, 2007; Mahalingam & Rodriguez, 2006), as well as about a range of other social categories (Haslam et al., 2000; Haslam & Levy, 2006; Haslam, Rothschild & Ernst, 2002).

It is clear from these studies that essentialisation of particular social categories is influenced by the social and cultural contexts that people live in, and this has also become increasingly clear from the studies of social

essentialism in childhood. For example, in Israel (Birnbaum et al., 2010; Deeb, Segall, Birnbaum, Ben-Eliyahu & Diesendruck, 2011; Diesendruck, Birnbaum, Deeb & Segall, 2013; Diesendruck, Goldfein-Elbaz, Rhodes, Gelman & Neumark, 2013; Diesendruck & ha Levi, 2006; Diesendruck & Haber, 2009; Diesendruck & Menahem, 2015; Segall, Birnbaum, Deeb & Diesendruck, 2014) a large body of work has shown that ethnicity (which has enormous ethno-political significance in Israel) is the most strongly essentialised social category among young children (particularly for Orthodox Jewish children), and across development the strength of children's ethnic essentialism appears to decline, with adults (at the end point of development) showing a preference for information about psychological traits over social categories (this body of research will be discussed further in Section 2.1.4.).

In Chile - a country where there is a wide socio-economic gap between the rich and poor- del Rio and Strasser (2011) explored 5 year old children's essentialist reasoning about poverty as a social category (del Rio & Strasser, 2011). Using more than one measure of essentialism, this research demonstrated that 5 year olds displayed essentialist beliefs about the inductive potential, innate potential and heritability of poverty. In contrast, similar research in Colombia with 5-7 year old children did not find strong essentialist beliefs about poverty (Amar, Abello, Llanos, Martinez Gonzalez, Monroy Agamez, Cortes Pena, Crespo Romero, 2015). Amar et al. (2015) found that Colombian children – particularly the 7 year olds – viewed poverty as a result of people's circumstances and poor access to resources, rather than as a heritable, stable and informative social category. Even though Colombia is a country, like Chile, where the gap between rich and poor is

extremely wide (Amar et al., 2015; del Rio & Strasser, 2011), the different findings from the two regions might reflect differences in what adults have come to believe about poverty, and perhaps have transmitted to their children[4]. As these studies did not examine parental input this remains to be seen in future research in South America.

As well as these studies in South America, research has also been conducted in South Africa (i.e., Giles et al., 2008) where it has been found that children hold strong essentialist beliefs about aggression in a country that has experienced high levels of conflict and violence. In South Korea – a collectivist society – Kim (2013) also explored children's essentialist reasoning about personality traits and found that South Korean children display a decline in essentialist reasoning about personality traits from 9 to 11 years of age, whereas American children in a study previously conducted by Gelman and colleagues (2007) found an increase in the essentialisation of personality traits across this age range.

Further research in the US (since the work of Taylor (1996) and Hirschfeld (1995; 1996)) has continued to examine essentialist beliefs about gender and race. Studies have shown that while gender essentialism emerges early at around 4 years of age, race essentialism is not always evident in early childhood (i.e., Kinzler & Dautel, 2012; Rhodes & Gelman,

[4] As mentioned in Chapter 1, adults' essentialist beliefs about certain categories, such as ethnicity or gender, have been found to vary with their ideological motivations in relation to these categories, or their position in the social hierarchy in relation to these categories (Morton et al, 2009a; 2009b; Mahalingam, 2003). Perhaps, poor people in Chile feel better about their status if they believe it is predetermined and cannot change, while poor people in Colombia may feel better about their status if they believe they can alter it and attribute it to external factors.

2009). The developmental trajectory of race and gender essentialism can vary depending on the social or cultural context of the sample. Furthermore, research has also found that language is strongly essentialised by US children (e.g., Byers, Heinlein & Garcia, 2014; Kinzler & Dautel, 2012).
It is clear from these studies that the developmental trajectory of social essentialism in childhood is strongly influenced by the child's cultural and social context. In the next section, I will discuss this in greater detail.

2.2.3. The effect of different social and cultural contexts on the development of social essentialism

To examine the impact of social and cultural context on the development of social essentialism in childhood, I will now discuss the research that has explored social essentialism across a variety of different contexts. One study in particular that demonstrates the power of an individual's social and cultural environment over their reasoning about others was carried out in Madagascar by Astuti, Solomon and Carey (2004). Astuti and colleagues conducted heritability studies (like Hirschfeld, 1995; 1996, and Taylor, 1996) with Vezo (an ethnic group) children, teenagers and adults. It was found that children showed essentialist reasoning; they believed that a baby adopted by another ethnic group would still share ethnic group membership with their birth parents. However, adolescents were less certain about whether ethnic group membership is heritable, while adults maintained that ethnic group membership was shared with the adopted parents. Astuti et al. explain that ethnic groups in Madagascar are not defined by biological factors but by where they live and the skills that they have (e.g., living by the

sea and knowing how to fish). Thus, this emphasis on how external factors can shape an individual – like where you live and what you can do – seem to override essentialist beliefs about the heritability and stability of a child's ethnic group membership at birth, by the time Vezo individuals reach adulthood.

As briefly mentioned in the previous section, Rhodes and Gelman (2009) found different developmental patterns of essentialist reasoning about gender and race depending on where in the US the sample of children lived. Rhodes and Gelman (2009) conducted a study examining the essentialisation of gender and race by children living in an urban area of the USA and in a rural, politically conservative area of the USA. In this study, children were presented with questions inviting them to reason about how natural and fixed, or arbitrary and flexible these categories were. The results revealed that at 5 and 7 years of age children living in both social contexts essentialised gender but not race. However, at 10 and 17 years of age children living in urban areas did not essentialise gender or race, while 10 and 17 year olds living in a rural area did essentialise gender and race. Thus, this study is notable for suggesting that living in a rural, homogenous, and politically conservative environment may foster stronger essentialist beliefs about social categories than living in a less homogenous, more socially diverse, urban environment.

Another interesting study conducted by Kinzler and Dautel (2012) also demonstrated effects of context. This research examined essentialist beliefs about the heritability and stability of language and racial categories in the US. It showed that European American children hold stronger essentialist beliefs

about language compared to race, across early and middle childhood, and it is not until 9 years of age that these children appear to essentialise race more than language[5].

In contrast, Kinzler and Dautel reported that African American children essentialised race more strongly than language from 5 years of age, indicating that these children may have experienced different social and cultural input about racial categories, specific to their own race group membership, that influenced their beliefs about race at an earlier age, or made race more salient to them. Analogous differences between groups living within the same dominant culture or society have been found in other research. For example, in the US, 10 year old children and adults who are religious Jews have been found to essentialise religion categories (Judaism and Christianity) more strongly than less religious Jewish and Christian participants (Chalik, Leslie & Rhodes, 2017). Similarly, in Israel, ethnic essentialism is much stronger among Orthodox Jewish children than among secular Jewish and Arab children (i.e., Birnbaum et al., 2010; Deeb et al., 2011).

A recent US study by Pauker et al. (2016) explored the effect of cultural context on the development of race essentialism in Massachusetts, a majority white region, and in Hawaii, which is so ethnically diverse there is no

[5] This is similar to the findings regarding race that were reported by Rhodes and Gelman (2009), and unlike the findings of Hirschfeld (1995; 1996). One possible reason for this discrepancy may be Hirschfeld's use of occupation and body build for comparison, rather than more richly clustered social categories in his research. It seems that race essentialism may emerge later in childhood among European American children depending on the environmental input they are likely to be receiving.

majority racial group. Children participated in a picture sorting task measuring race salience, a task examining children's endorsement of group stereotypes, and a heritability/stability task exploring essentialist beliefs about what children thought the child of a particular adult would look like and what the adult looked like themselves as a child. The authors reported that the salience of race increased with age, from 4-11 years of age, in both contexts, but it was only in Massachusetts that children essentialised race more strongly as they got older, and this was associated with increased stereotyping of outgroups. This study indicates that living in an ethnically diverse cultural environment has a positive effect on the tendency to stereotype outgroups, and this is associated with weaker essentialist beliefs about race.

Among adults in India, Mahalingam (2003) explored reasoning about caste, which determines status in Indian society. Adults were presented with brain transplant stories and were asked to decide if the transplant would change caste/ethnicity. Brahmins essentialised their own group – the rich man – saying the rich man would not be changed by a poor man's brain, but they believed a poor man would be changed by a rich man's brain. However, Dalit participants did not show essentialist reasoning; they viewed either type of transplant as having the potential to change caste. These responses could have been motivated by strategic essentialism (as discussed in Chapter 1, e.g., Morton et al., 2009a; 2009b), or it could reflect differences in social or cultural input that is received about the caste hierarchy, depending on one's caste group membership.

In a US study of children's essentialist beliefs about language categories, Byers-Heinlein and Garcia (2015) reported findings indicating that the experience of learning a second language in childhood can have a generalized effect on essentialist reasoning about categories. They investigated 5-6 year olds' essentialist beliefs about the heritability and stability of human language categories, different animal vocalizations, and physical animal traits. It was found that children who learned a second language within the first few years of life did not essentialise language categories, animal vocalizations, or physical animal traits, while monolingual children held strong essentialist beliefs about all of these. These findings suggest that the experience of receiving input at a young age about the fluidity of language can lead children to view other categories as fluid, and attenuate their essentialist bias.

Taken together, the research discussed here demonstrates how an essentialist bias about social categories can emerge and develop differently depending on the social and cultural context that children live in. What is yet to be fully understood is how the social messages transmitted in a child's environment come to be received by them. It is not clear whether parental input is the main mode of transmission (i.e., how parents overtly talk about social categories, or more subtle cues like generic language use – e.g., Gelman, 2003; Gelman et al., 2008; Goldin-Meadow et al., 2005; Segall et al., 2015), or if a child's immediate social environment (e.g., school or local community) is where information and attitudes towards certain social categories is absorbed due to the ethos of the environment and subtle cues about the attitudes of others, or it may be the level of social diversity

experienced in different types of environments (e.g., Connolly, Smith & Kelly, 2002; Deeb et al., 2011; for positive effects of social diversity see Turner, Tam, Hewstone, Kenworthy & Cairns, 2013).

Although all three modes of transmission are likely to play a role, as the focus of this thesis is on the development of children's essentialist reasoning in the Northern Irish context, a discussion of exact modes of transmission is beyond the scope of this review.

2.2.4. The Israeli case study

Whichever the route essentialist beliefs are transmitted by, there is clear evidence that social essentialism exists and that the context has an important influence on which categories are essentialised. Given that the focus of this thesis is on the development of essentialism in Northern Ireland, recent work in Israel on essentialised ethnicity categories is particularly relevant. In fact, the most extensive examination of social essentialism in childhood has been conducted in Israel by Diesendruck and colleagues, using a number of different measures to collect converging evidence of ethnic essentialism (Birnbaum et al., 2010; Deeb et al., 2011; Diesendruck, Birnbaum, et al., 2013; Diesendruck, Goldfein-Elbaz, et al., 2013; Diesendruck & ha Levi, 2006; Diesendruck & Haber, 2009; Diesendruck & Menahem, 2015; Segall, Birnbaum, Deeb & Diesendruck, 2015).

In their first study of this kind, Diesendruck and ha Levi (2006) employed a forced choice task (similar to Gelman and Markman; 1986) with 5 year old Jewish children and adults. Participants had to decide which of two test pictures (e.g., a girl who is Jewish, shy and likes to play zigo, or a girl

who is Arab, friendly and likes to play zaber) was most likely to share a commonality (i.e., zigo or zaber) with a target character (e.g., a girl who is Jewish and friendly). Thus, Diesendruck and ha Levi (2006) invited participants to choose between different social categories, as well as between social category membership and personality traits when drawing inferences about others. The social categories included in this study were ethnicity, social status, religiosity and gender.

This study showed that 5 year old Jewish children essentialised social category membership over personality traits, while adults did the opposite and privileged personality traits more. Further to this, the authors also examined children's preference (compared to chance) for each social category as a source for induction. The findings indicated that Jewish 5 year olds essentialised ethnicity and social status at a rate greater than chance, while their reasoning about religiosity and gender did not differ from chance. In contrast, adults did not seem to essentialise religiosity or gender (which were below chance), while their treatment of ethnicity and social status did not differ from chance. This would suggest that even though adults treated personality traits as more informative than social category membership, they still were more likely to hold essentialist beliefs about ethnicity and social status (like children) than for religiosity or gender.

Following this, Birnbaum et al. (2010) conducted another forced choice induction study examining the essentialist reasoning of Arab as well as Jewish orthodox and secular children, aged 5, 7 and 11 years old. The findings of Diesendruck and ha Levi (2006) were replicated with children living in Israel showing stronger essentialist reasoning about ethnicity and

social status than they did about gender and religiosity. In addition, this study was able to demonstrate effects of age and ethnic group membership on children's essentialist reasoning. Orthodox, Jewish children essentialised ethnicity most strongly, while secular Jewish children and Arab children responded at chance level when reasoning about ethnic categories. As well as this, it was reported that 5 and 7 year old children showed more essentialist reasoning about social categories in general, than they did about personality traits. On the other hand, 11 year olds were equally as likely to show essentialist reasoning about personality traits as about social categories, suggesting that the strength of children's essentialist reasoning about social categories declined in later childhood.

In addition to this, Diesendruck and Haber (2009) also examined children's essentialist beliefs using (the Essentialism Components Questionnaire (ECQ) to explore different aspects of essentialist thinking (i.e., beliefs about non obvious differences between category members, discreteness of boundaries, stability and immutability of category membership, and the innate potential and heritability of category membership). The participants in this study were Secular Jewish children, and Orthodox Jewish children, aged 6-7 years and 10-11 years. The social categories examined were ethnicity, gender, race, and socio-economic status (SES).

The results of this study revealed that children's essentialist beliefs clustered into two dimensions, which the authors called 'distinctive properties' (i.e., how discrete category boundaries are and how informative categories are) and 'stable membership' (i.e., innate potential, heritability, and stability of

category membership). It was found that for 'distinctive properties', all children essentialised ethnicity, gender and SES equally and more so than race. There was an effect of children's own religiosity on their beliefs about ethnicity only; while all 6-7 year olds essentialised ethnicity, 10-11 year old, orthodox Jewish children endorsed essentialist beliefs about ethnicity more strongly than 10-11 year old secular Jewish children.

For 'stable membership', all children essentialised race most, followed by gender, then ethnicity, and then SES. There was an effect of children's own religiosity, with 10-11 year old orthodox, Jewish children essentialising gender and race more than other social categories. In addition to this, comparisons to chance revealed that orthodox children were above chance in their endorsement of essentialist beliefs about the distinctiveness of ethnicity, while secular children were at chance (neither group strongly endorsed essentialist beliefs about stability for ethnicity). This questionnaire study shows that while Jewish children held essentialist beliefs about social categories, including ethnicity, their beliefs were not coherent (children reasoned differently about category distinctiveness and category stability) and differences between orthodox and secular children emerged at 10-11 years of age.

As well as employing forced choice induction tasks and questionnaires, Diesendruck, Birnbaum et al. (2013) examined essentialist beliefs about social categories using a heritability task and the switched-at-birth task with secular Jewish and Arab children. Children were asked to decide which of two children were likely to be the offspring of an adult, depending on which social categories they shared membership of with the

adult. Five year olds did not appear to believe that any category was more heritable than another, while 7 and 11 year olds appeared to hold stronger essentialist beliefs about the heritability of ethnicity and social status than they did about religiosity, occupation and body build. Thus between 5 and 7 years of age there was an increase in children's level of ethnic essentialism. On the switched-at-birth task, it was reported that 5 and 7 year old children displayed essentialist beliefs about the heritability and innate potential of ethnicity (while their beliefs about social status and religiosity were at chance), while 11 year old children did not. Thus, ethnic essentialism in Israel appeared to be strong at 5 years of age and declined between 7 and 11 years of age on this measure. This difference between the two different measures of essentialism may have emerged because the heritability task forced children to make a relative choice between social dimensions, while the switched-at-birth task allowed children to display their absolute level of essentialist thinking about each social dimension rather than having to choose between them.

Having established that children from Israel display strong essentialist reasoning about ethnic categories, with differences emerging depending on age, the method used, and the religious sector that children were members of, Diesendruck et al. focused on drilling further down into the influence of social and cultural input on children's reasoning. Deeb et al. (2011) decided to examine the effect of educational context on children's ethnic essentialism; they explored the salience of ethnicity (i.e., using a guessing game about social categories, and recall of social categories mentioned in a story) and essentialist beliefs (using the ECQ) about ethnicity, among orthodox Jewish

children, secular Jewish children, and Arab children in regular, homogenous school environments in Israel and in integrated schools.

Overall, it was found that 5 year old Orthodox Jewish children displayed strong essentialist beliefs about ethnicity, while an effect of educational context emerged at 7 years of age. At 7 years of age, ethnicity was more salient for Orthodox Jewish children attending integrated schools, than it was for Orthodox Jewish children attending homogenous schools. Furthermore, Orthodox Jewish children attending integrated schools showed less ethnic essentialism at 7 years of age, while this decline was not apparent in regular, segregated schools until 11 years of age for Orthodox Jewish children. Thus, attending an integrated school appeared to increase awareness of ethnic categories, and attenuate ethnic essentialism at an earlier age for Orthodox Jewish children, compared to Orthodox Jewish children in regular homogeneous schools. This may be because experiencing intergroup contact can have a positive effect on children's social cognition (e.g., Turner et al., 2013), or it may be due to the ethos of integrated schools, or alternatively it may be a reflection of the beliefs of parents who choose to send their children to an integrated school (e.g., Diesendruck & Menahem, 2015; Segall et al., 2015). Either way, Orthodox, Jewish children from an integrated educational context displayed a different pattern of ethnic essentialist reasoning compared to Jewish children from a segregated educational context, and from secular Jewish and Arab children.

Further to this, Diesendruck, Goldfein-Elbaz et al. (2013) conducted a cross-cultural study in which essentialist beliefs about categories (ethnicity, race, gender, animals, artifacts and occupation) in Israel and the USA were

directly compared. Using the questions designed by Rhodes and Gelman (2009) examining the objectivity versus flexibility of social categories, the authors again found that Israeli children, at 5 and 10 years of age, essentialised ethnicity more than any other category, and they essentialised gender more than race. While race was expected to be the most essentialised category in the US (i.e., based on prior research, Hirschfeld, 1995; 1996; Rhodes & Gelman, 2009), it was found that American children displayed stronger essentialist beliefs about ethnicity, gender and animal categories than they did about race. Only further research on race essentialism in the US can shed light on this finding; as previous studies have found, there are different factors that seem to influence the development of racial essentialism in the US. Such factors are where participants live, the cultural and social input that they receive about racial categories (Rhodes & Gelman, 2009), the racial category that participants themselves are members of (Kinzler & Dautel, 2012), and the method that is used to measure race essentialism.

More recently, Diesendruck and colleagues have turned their attention to investigating the link between essentialist beliefs, and stereotyping and prejudice towards outgroups. Segall et al. (2015) found that parents – particularly orthodox Jewish parents – whose 5 year old children attended *de facto* segregated schools in Israel, showed stronger essentialist beliefs about ethnic categories than parents of children who attended integrated schools, and they were more averse to negotiating a resolution to the conflict between Jews and Arabs. In addition to this, these parents endorsed more negative stereotypes about Arabs than the parents of integrated school children, they

labelled ethnic categories more, and it was found that the children of these parents showed stronger essentialist reasoning about ethnicity than integrated school children. This study demonstrated the link between ethnic essentialism and negative attitudes towards ethnic outgroups, as well as the complex interplay that exists between parental input about social categories and the type of school children attend, on the development of children's social cognition.

Further to this, Diesendruck and Menahem (2015) directly examined the link between ethnic essentialism and intergroup bias with secular Jewish 6 year olds. It was reported that when children were told a story that was intended to prompt essentialist beliefs about ethnicity – rather than an essentialist story about animals or a story that was not essentialist at all – children drew pictures with Jews and Arabs further apart, and with more positive facial expressions on Jewish characters. Moreover, boys who listened to the story prompting ethnic essentialism also displayed more inter-ethnic bias when completing an implicit association task. This study is one of few that has investigated the link between social essentialism, stereotyping, and intergroup bias in childhood (see Mandalaywala & Rhodes, 2017; Pauker, Ambady & Apfelbaum, 2010; Pauker et al., 2016); the majority of these studies have been conducted with adults (see Bastian & Haslam, 2006; Dar-Nimrod & Heine, 2011; Haslam, Bastian, Bain & Kashima, 2006; Mahalingam, Haritatos & Jackson, 2007; Morton et al., 2009a; 2009b; Prentice & Miller, 2007; Rangel & Keller, 2011).

Taken together, the research on childhood essentialism in Israel can be considered a comprehensive case study documenting how social

essentialist reasoning emerges and what form it takes in a society that has been divided by an ethno-religious conflict. As such, the findings from Israel constitute a good starting point for research on essentialism in a society such as Northern Ireland (NI). NI shares commonalities with Israel as a society that has experienced (and continues to experience) violent inter-ethnic conflict, and is largely polarised by ethno-religion category membership (Gillespie, 2010; Gough, Robinson, Kremer & Mitchell, 1992; Nolan, 2014). Also like Israel, Northern Ireland has made attempts at improving intergroup relations through the creation of integrated education (Gallagher, 2010; Hewstone, Cairns, Voci, Paolini, McLernon, Crisp, Niens & Craig, 2005; O'Connor, 2002; Smith, 2001), but the majority of schools in Northern Ireland remain segregated by default. Thus, the research detailed in this thesis is based on studies carried out by Diesendruck and colleagues, and is intended to comprise a case study of the development of social essentialism in Northern Ireland – the first of its kind within this social and cultural context.

2.3. The present research: The development of children's essentialist reasoning about social categories in Northern Ireland.

The current research examines the development of children's essentialist reasoning about the ethno-religion groups, Catholic and Protestant, in Northern Ireland. As previously alluded to, Northern Ireland is a society polarised by ethno-religion group membership due to its history of sectarian intergroup conflict (see Darby, 1995; Gough et al., 1992; Rees, 2001). The most recent period of conflict that Northern Ireland has emerged from was *The Troubles*, which is a period of intergroup violence lasting from 1968 to

1998 (for a detailed history see Gillespie, 2010). While the terms *Catholic* and *Protestant* contain religious connotations for most people in other parts of the world, in NI they are tied up with cultural and political sentiments. Traditionally, the Catholic community has culturally identified more strongly with Ireland, and aspired politically to a united Ireland, while the Protestant community has identified more strongly with Britain and supports the political union between Northern Ireland and the UK (Gillespie, 2010). These differences between the two groups have been a source of conflict – along with perceived inequalities in the distribution of power and resources – and even in post-conflict times, Northern Ireland continues to experience sporadic acts of sectarian violence, paramilitary activity, and friction over issues such as parades, flags, policing, and historical enquiries (Gough, Robinson, Kremer & Mitchell, 1992; McEvoy, McEvoy & McConnachie, 2006; Nolan, 2014). NI society is still largely segregated through the education system, the areas people choose to live in, by marriage, and in the ways people culturally express themselves. Therefore, it seems reasonable to expect that children in NI will show indications of essentialist thinking about ethno-religion categories, just like children in Israel have (e.g., Birnbaum et al., 2010).

Post-conflict research into children's awareness and reasoning about religion categories in NI since the end of the troubles has been limited with a small number of studies conducted by Connolly and colleagues (Connolly, 2009; Connolly, 2011; Connolly, Kelly & Smith, 2009; Connolly, Smith & Kelly, 2002). The findings of Connolly and colleagues revealed that from as young as 3-4 years of age, significant markers of ethno-religion categories in

NI are already beginning to impact on children's awareness, with preschool children showing a preference for particular colours of flags (i.e., the British and Irish flags), cultural activities (e.g., Irish dancing, parades), and sports (e.g., rugby, hurling, certain football shirts) traditionally associated with their own ethno-religion group. Furthermore, by 6-7 years of age, some of the children in these studies expressed concepts of the categories *Catholic* and *Protestant*; 34% said that they belonged to one of these ethno-religion groups, and some even expressed negative attitudes towards their perceived outgroup (Connolly, 2009; Connolly, 2011; Connolly, Kelly & Smith, 2009; Connolly, Smith & Kelly, 2002). Thus, even though ethno-religion group membership may not be as salient as it once was during The Troubles (e.g., Cairns, 1980; Cairns, Hunter & Herring, 1980; Jahoda & Harrison, 1975; McWhirter & Gamble, 1982), there is good reason to suspect that it enters children's awareness at some point in development in Northern Ireland, and is likely to impact on their social cognition, as it continues to be emphasised as a highly meaningful dimension to categorise people along in NI. It is the goal of the present research to investigate this, as there have been no prior cognitive studies that have extensively examined children's reasoning about ethno-religion categories in NI. Furthermore, the establishment of integrated schools in NI – as in Israel – offers another unique social context for investigating the development of essentialist reasoning about ethno-religion categories (O'Connor, 2002; Smith, 2001).

Approximately 5% of children in NI attend an integrated school (Gallagher, 2010; Nolan, 2014), most other children attend schools that are either majority Catholic and maintained by the Catholic Church – *Catholic*

Maintained Schools – or majority Protestant and controlled by the State – *State Controlled Schools*. The establishment of integrated education in NI is rooted in contact theory, and the majority of social research in NI has focused on intergroup attitudes and measuring the success of contact theory embedded within integrated schools and cross-community school projects (Gallagher, 2010; Hewstone et al., 2005; O'Connor, 2002; Smith, 2001; for Shared Education Programme review see Niens, Kerr & Connolly, 2013). Due to the fact that intergroup contact is intended to reduce intergroup bias and this has had some success in NI (Hewstone et al., 2005; Niens et al., 2013; O'Connor, 2002), there is good reason to suspect that children from the integrated sector in NI may display less ethno-religion essentialism in comparison to other children attending segregated schools, similar to the findings of Deeb et al. (2011) with integrated school children in Israel. This is another major goal of the present research; to not only examine the development of social essentialism in Northern Ireland as a whole, but also within different educational contexts.

To conclude this chapter, I will end with a brief overview of the research that will be presented in this thesis. Chapters 3-6 detail four inference studies that were carried out, three in Northern Ireland and one in the USA. This series of inference studies was intended to give as comprehensive a picture as possible of the nature and context-specificity of the development of social essentialist reasoning about religion categories in NI. Chapter 7 details a questionnaire study that was conducted in NI, based on the ECQ previously described in some of the research conducted in Israel (e.g., Diesendruck & Haber, 2009). This study was conducted to provide a

different measure of social essentialism alongside the extensive inference data that was collected. Finally, Chapter 8 is a meta-analysis of the four NI studies contained within this thesis, and was carried out so that the entire NI dataset could be explored as a whole. The results of these studies and their practical and theoretical implications are discussed in Chapter 9.

Chapter 3: Study 1

3.1. Introduction

As outlined in the preceding two chapters, the aim of this thesis is to present a case study of the development of social essentialism in Northern Ireland (NI), similar to the extensive body of research that has been conducted in Israel, and with the aim of building on those findings by documenting the emergence and development of essentialist thinking about different social categories within a different cultural context. As the previous chapter has shown, the picture provided of the development of social essentialism in childhood is not as coherent as the one that emerges from the literature about natural kind categories (i.e., see Chapter 1), in which children seem to be universally in agreement that naturally occurring categories – such as dog, cat, bird, tree, gold – are rich in obvious and non-obvious properties (which makes category membership informative), have discrete, immutable boundaries, are heritable and possess innate potential, and have a central, underlying property or essence (see Gelman, 2003). Cultural input about various social categories constrains the development of children's essentialist beliefs about social dimensions; thus, there is no universal pattern to children's essentialist reasoning about the social world across social contexts (e.g., Astuti et al., 2004; Mandalaywala & Rhodes, 2017; Rhode & Gelman, 2009).

Essentialist beliefs about social categories emerge at different points in development, in relation to specific categories that are treated as particularly meaningful, in many different social and cultural contexts (e.g., Deeb et al., 2011; del Rio & Strasser, 2011; Kinzler & Dautel, 2012; Rhodes

& Gelman, 2009). Within the social literature, Diesendruck and colleagues in Israel have given the most thorough developmental account (Birnbaum et al., 2010; Deeb et al., 2011; Diesendruck, Birnbaum, et al., 2013; Diesendruck, Goldfein-Elbaz, et al., 2013; Diesendruck & ha Levi, 2006; Diesendruck & Haber, 2009; Diesendruck & Menahem, 2015; Segall, et al., 2015). The Israeli research indicates that ethnicity – a highly meaningful social dimension in Israel – is the social dimension most essentialised by Jewish children living in the country (and is also preferred to information about personality traits) (see Diesendruck, Goldfein-Elbaz, et al., 2013; Diesendruck & ha Levi, 2006; Diesendruck & Haber, 2009; Birnbaum et al., 2010). This ethnic essentialism emerges early in childhood with children arriving at Kindergarten with these beliefs in place (Deeb et al., 2011; Diesendruck & Menahem, 2015; Segall et al., 2015), and ethnic essentialism in Israel declines in strength across childhood and at an earlier age for Jewish children within the integrated school sector than for children attending regular, *de facto* segregated schools. At present, it is impossible to know whether the pattern of reasoning found in Israel is specific to the social, historical and political context of that country, or whether this might be a typical developmental pattern in regards to ethno-religion categories across cultural contexts. The current research aims to further our understanding of the development of social essentialism by conducting a similar case study, examining different ethno-religion categories (Catholicism/Nationalism and Protestantism/Unionism in NI), in a different context.

Further to this, while more studies are beginning to directly compare essentialist reasoning across cultures (e.g., Diesendruck, Goldfein-Elbaz et

al., 2013), there has been surprisingly little attention paid to educational context and there are no studies looking at its effects on essentialist reasoning in the types of experimental tasks that are standardly used, such as inference tasks (but see Deeb et al., 2011, study of the effects of educational contexts on memory and questionnaire responses). This thesis not only provides a developmental account of social essentialism in a different cultural context (NI), it also examines the effect of different educational contexts on children's essentialist reasoning.

As outlined at the end of the previous chapter, Northern Ireland is a society that is polarized by a violent history of ethno-religious conflict between *Catholics* and *Protestants* who disagree about whether NI should be governed by the Republic of Ireland (i.e., the position of mainly Catholic Nationalists) or continue to be governed as part of the UK (i.e., the position of mainly Protestant Unionists) (Gillespie, 2010). Thus, ethno-religion group membership is the most meaningful social dimension that people are categorized by in NI, and this division continues to present itself in NI's mainly *de facto* segregated education system, the areas that people choose to live in, marriage, and the cultural activities (e.g., parades, Irish dancing) and sports that people choose to engage in (Gallagher, 2010; Gough et al., 1992; Nolan, 2014). Integrated education was established as a response to the ethno-religious division and conflict (O'Connor, 2002; Smith, 2001) with the aim of contact improving intergroup attitudes (Hewstone et al., 2005), and accounts for approximately 5% of schools in NI (Gallagher, 2010). For these reasons, religion is the main social dimension of interest in examining the development of social essentialism within the Northern Ireland context, and

the existence of integrated education in NI offers another unique context (similar to Deeb et al., 2011, in Israel) within the wider culture for examining potential effects of exposure to social diversity on children's essentialist reasoning.

3.1.1. The current study

This case study was modelled on the research detailed in the paper by Birnbaum and colleagues (2010), who investigated the development of ethnic essentialism in Israel using a forced choice inference task – a task that has been commonly used to index the strength of essentialist reasoning (e.g., del Rio & Strasser, 2011; Gelman et al., 1986; Gelman & Markman, 1986; Taylor & Gelman, 1993). Birnbaum et al. examined children's pattern of category based inferences, as an index of the strength of their essentialist beliefs about the ethnic categories, Jew and Arab, as well as about social status, religiosity, gender and personality traits. As described in Chapter 2, this forced choice inference task invited children to choose between shared membership of two categories when deciding which of two base characters a target category was most likely to share other commonalities with. For example, in a trial contrasting religion and gender, the first base character is an Arabic boy who wants to be a *Mashitz* when he grows up, the second base character is a Jewish girl who wants to be a *Nagim* when she grows up, and the target character is an Arabic girl. Children were asked to infer which novel occupation the target is most likely to aspire to, based on the social category memberships she shares with each of the base characters, thereby measuring the inductive potential of each category.

The use of novel properties, such as 'wants to be a *Nagim*', is a common methodological feature when examining the inductive inferences of children (see Murphy, 2002). This is because the use of a blank predicate means children have only information about category memberships to base their responses on when deciding whether to project a property, thus providing a stronger test of the inductive power of categories. In a series of 12 trials, Birnbaum et al. measured the inductive potential of each dimension relative to another: they contrasted ethnicity with gender across two trials, ethnicity with social status across two trials, ethnicity with religiosity across two trials, gender with social status across two trials, gender with religiosity across two trials, and social status with religiosity across two trials. The authors also examined the inductive potential of the social categories compared to personality traits across eight trials – for example, one base is a shy Jew, the other base is a nice Arab, and the target is a shy Arab, thus inviting children to project on the basis of ethnicity or personality traits. As mentioned before, the findings reported by Birnbaum et al. (2010) suggested that ethnic essentialism is evident in children's reasoning from at least 5 years of age, and orthodox Jewish children in Israel were much more essentialist about ethnicity than secular Jewish and Arab children. Further to this, essentialist reasoning about ethnicity was stronger than it was for other social categories (with the exception of social status which was almost as strongly essentialised as ethnicity), as well as personality traits. It was also indicated that the strength of ethnic essentialism declined between 7 and 11 years of age in Israel, with 11 year olds choosing to make inferences based on personality traits equally as often as they used social categories. This

decline in the strength of ethnic essentialism in later childhood was also found by Deeb et al. (2011), who also reported that this became apparent at the earlier age of 7 for Jewish children attending integrated schools.

The current study, of social essentialist reasoning across childhood in Northern Ireland, is intended to contribute to the literature by complementing the Israeli case study. This first study is a forced-choice inference task, similar to the inference task employed by Birnbaum et al. (2010), and the dimensions that are contrasted in it are religion (*Catholic* and *Protestant*), gender (*boy* and *girl*), and a control category of 'pet ownership' (i.e., of either a *goldfish* or a *hamster*). For the reasons described in the previous chapter and the introductory section above, religion is the primary social dimension of interest in this study. Gender was included as a contrasting social category as gender is known to feature as a highly natural and powerful category in children's social cognition (e.g., Halim & Ruble, 2010; Taylor et al., 1996). An arbitrary control category was included against which to measure the inductive potential of religion and gender categories. The control category is particularly important because ethno-religion categories in NI might well be a novel, arbitrary grouping for some young children if they do not have experience, and well developed concepts, of religion categories. Accordingly, an absence of differences between the control and other social categories can be interpreted as evidence that those social categories have not been essentialised.

Research exploring children's awareness and concepts of ethno-religion categories in NI has found that approximately one third of children identify themselves as members of a particular religion category, and even

express prejudice by 6-7 years of age (Connolly, 2009; Connolly, 2011; Connolly, Kelly & Smith, 2009; Connolly, Smith & Kelly, 2002), while markers of these categories (i.e., flags, parades, names, sports) begin to infringe on their awareness from 3 years of age. For this reason, the earliest point in development that the current research focuses on is 6-7 years of age (up to 10-11 years of age), when a large number of children are likely to have some understanding of the significance of religion in NI or at least a developing awareness of the existence of these categories. These children were recruited from *de facto* segregated school and also from the integrated school sector.

The initial predictions about the development of ethno-religion essentialism in NI are based on the findings from Israel. It is predicted that children from 6-11 years of age in NI will show evidence of holding stronger essentialist beliefs about religion categories, than for gender and a control category. It is expected that the strength of children's essentialist reasoning about religion categories will decline in later childhood at around 10-11 years of age, and it is expected that this decline in the strength of children's ethno-religion essentialism will become apparent at an earlier stage within the integrated school sector. Further to this, there might also be differences between Catholic and Protestant children in their essentialist reasoning about religion, similar to the group differences found between orthodox Jewish children and secular Jewish and Arab children in Israel (Birnbaum et al., 2010; Deeb et al., 2011; Diesendruck & Haber, 2009

3.2. Method

3.2.1. Participants

Participants were 174 children, aged 6-11 years, recruited from State controlled (majority Protestant), Catholic maintained (majority Catholic), and integrated schools in Northern Ireland. Demographic information about the sample is presented in Table 1. The percentage of students receiving free school meals in each school can be taken as an indication of the socio-economic status of children attending that school (Muldoon & Trew, 2000), as children receiving free school meals are of a lower household income. All children who participated in this research did so with full written parental consent, as well as giving their own verbal assent to taking part. Ethical approval for this study can be found in Appendix 1.

3.2.2. Design and materials

Children were presented with a forced choice inference task, similar to the previously outlined method used by Birnbaum et al. (2010), in which children had to choose between two competing dimensions as a basis for inference. The three dimensions presented to children in this task were religion, gender and a control – the control categories were ownership of a hamster or a goldfish. The task consisted of 12 trials, and in each trial children were presented with triads of hand-drawn pictures depicting child characters. There were no visual cues highlighting membership in religion categories or the control categories in these pictures; the only visual cues presented depicted the gender category membership of the characters (see the materials in Figure 2 and Figure 3) – thus, only gender cues were

Table1. Additional information about the sample in Study 1.

School Type	Age Group	Religion	Percentage of Students Receiving Free or Subsidized Meals
State-Controlled	6-7 years old: N=19 8-9 years old: N=20 10-11 years old: N=20	Catholic: 0% Protestant: 66% Other/Mixed: 5% Not Religious: 29%	61%
Catholic-Maintained	6-7 years old: N=19 8-9 years old: N=20 10-11 years old: N=17	Catholic: 89% Protestant: 0% Other/Mixed: 9% Not Religious: 2%	48%
Integrated	6-7 years old: N=19 8-9 years old: N=20 10-11 years old: N=20	Catholic: 29% Protestant: 19% Other/Mixed: 15% Not Religious: 37%	16%

presented pictorially, as well as by category labels. Religion categories and the control categories were only presented by their labels. The labels presenting religion categories were **Catholic** and **Protestant**, the labels presenting the control categories were **'owns a goldfish'** and **'owns a hamster'**, and the labels presenting gender group membership were **boy** and **girl**. In total, 36 pictures were used; 3 different pictures were presented in each of the trials.

Of the 12 trials that children were presented with, each trial consisted of a triad of one target and two test pictures, and children were presented with a conflict between two dimensions in each triad. In each experimental trial, one test picture shared category membership with the target picture along one dimension, and the other test picture shared membership with the target picture along a different dimension. For example, Figure 2 shows a triad in which the conflict is between membership in religion categories and membership of gender categories. In this example, one test picture shares religion group membership (not gender) with the target – they are both Catholic – and one test picture shares gender group membership (not religion) with the target – they are both girls. In triads where the forced choice was between membership of religion categories and membership of the control categories, gender categories were kept constant and so all three pictures were drawn as the same gender (for an example see Figure 1) – two out of four triads showed all male characters, and two out of four triads showed all female characters.

The 12 trials can be viewed as consisting of three sets of forced choice triads. Set 1 presented a conflict between religion categories and the control categories, Set 2 presented a conflict between religion categories and gender categories, and Set 3 presented a conflict between gender categories and the control categories. Each set consisted of four trials. The trials within each set differed by presenting the participant with each possible combination of the two dimensions being presented. So to use the conflict between religion categories and gender categories (set 2) as an example, the four trials would consist of: 1. A Catholic boy target, which shares religion

with a Catholic girl test picture and gender with a Protestant boy test picture. 2. A Catholic girl target, sharing religion with a Catholic boy and gender with a Protestant girl, 3. A Protestant boy target, sharing religion with a Protestant girl and gender with a Catholic boy, and 4. A Protestant girl target, sharing religion with a Protestant boy and gender with a Catholic girl. The order of each set of triads was counterbalanced across participants.

For each test picture, the character in it was presented as possessing a different novel property, these properties were counterbalanced across the triads and were: noxy, flirst, trun, dwauche, gleeve, parl, pline, skivered, chaunch, flarp, sproice, pent, parkled, gline, legan, skushed, fric, taff, dober, trand, femey, prote, wolk, rowd, preper, and swelk. The order of presentation of each set of triads and the novel attributes used were counterbalanced across participants. The order of the verbal labels used to present each of the two categories in each picture was also counterbalanced.

A practice trial, which can be seen in Figure 3, was conducted before the main trials in order to familiarize children with the task and the materials. The remaining 12 triads were the experimental trials. In the familiarization trial, children were not presented with a forced choice; only one of the test pictures shared categories with the target, presenting no conflict for children as can be seen in Figure 3. All children received the same familiarization trial in terms of the pictures used and the familiar properties presented (i.e., food preferences and activity preferences), the exception was that half of the children were presented with noxy and gline as the novel properties, and the other half received legan and flirst as the novel properties.

Test 1. "This child owns a goldfish and goes to a Catholic Church. This child is flirst."

Test 2. "This child owns a hamster and goes to a Protestant Church. This child is legan."

Target. "This child owns a goldfish like this child here (points to test 1), and goes to a Protestant Church like this child here (points to test 2). Do you think this child is flirst like this one (points to test 1) or legan like this one (points to test 2)?"

Figure 1. An example of a triad presenting a conflict between religion category membership and membership of the control categories (pet ownership) in Study 1.

Test 1. "This child goes to a Catholic Church and is a boy. This child is gleeve."

Test 2. "This child goes to a Protestant Church and is a girl. This child is sproice."

Target. "This child goes to a Catholic Church like this child here (points to test 1), and is a girl like this child here (points to test 2). Do you think this child is gleeve like this one (points to test 1) or sproice like this one (points to test 2)?"

Figure 2. An example of a triad presenting a conflict between religion group membership and gender group membership in Study 1.

Test 1. 'This child here is a boy and likes to play football and eat ice-cream. This child here is *noxy*'.

Test 2. 'This child here is a girl and likes to go swimming and eat chocolate. This child here is *gline*'.

Target. 'This child is a boy like this child here (points to test picture 1) and likes to play football and eat ice-cream. Do you think this child is *noxy* like this child (points to test picture 1) or *gline* like this child (points to test picture 2)?

Figure3. The familiarization trial used in Study 1, presenting no conflict between activities and food preferences.

3.2.3. Procedure

Children who had written parental consent were tested individually in a quiet area of their school. They were told that the experimenter was

interested in how children think about others and that there were no right or wrong answers to the questions that they would be asked. Children were then presented with a practice trial to help them become familiar with the stimuli and the novel words that would be presented to them throughout the experimental trials. The experimenter then proceeded with the 12 experimental trials.

Figure 2 shows an example of an experimental triad presenting a conflict between religion categories and gender categories. As Figure 2 illustrates, children were presented with three pictures – two test pictures and one target picture. When presented with the first test picture the experimenter said (using Figure 2 as an example) “Look at this child here. This child goes to a Catholic Church and is a boy. This child is gleeve.” The second test picture was presented and the experimenter said “Look at this child here. This child goes to a Protestant Church and is a girl. This child is sproice.” The target was then presented and the experimenter said “Look at this child here. This child goes to a Catholic Church like this child (the experimenter points to the first test picture) and is a girl like this child (point to the second test picture). Do you think this child (points at the target) is gleeve like this child (points to test picture 1) or sproice like this one (points to test picture 2)?

Thus, children were asked to choose between shared membership in the same religion category and shared membership in the same gender category when deciding whether to draw a novel inference. There were no children who were unwilling to make an inference at any point during the task.

3.3. Results

3.3.1 Scoring

For each of the trials (there were four trials in each triad set) children were given a score of 1 for whichever dimension they chose to base an inference on. For example, when religion categories and gender categories were put into conflict, a child would score 2 for religion if they chose to base an inference on religion category membership in two out of the four trials, and they would score 2 for gender if they chose to base an inference on gender category membership in the other two out of four trials. So for each set of triads, children were given a score out of 4 for each of the two categories that they had an opportunity to base an inference on.

To analyze children's category based inferences collapsed across the three sets of triads, children were given a general score out of 8 for each dimension. This is because children had the opportunity to base an inference on each dimension eight times across the entire task. For example, when religion categories were put into conflict with gender categories in one set of triads, and religion categories were put into conflict with the control categories in another set of triads (and in the third set of triads, gender category membership and membership of the control categories were put into conflict), there were 8 trials in total in which children could choose to base an inference on religion group membership rather than on either of the other dimensions.

3.3.2. Main findings

Due to the forced choice design of the task, dimension could not be included as an independent variable in an analysis of variance, so children's inferences based on each dimension were compared using paired sample t tests (Bonferroni adjusted, p=0.017). The means indicated that children treated religion category membership as the strongest basis for inference (M=4.94, SD=1.92), followed by membership of the control categories (M=3.79, SD=1.69), followed by gender category membership (M=3.27, SD=1.93), which was treated as the weakest basis for projecting properties. The paired t tests revealed that children made significantly more inferences based on membership in religion categories than they did based on membership of the control categories, t(173)=4.75, p<0.001, Cohen's d=0.62, or membership of gender categories, t(173)=6.47, p<0.001, Cohen's d=0.87. Children's inferences based on gender group membership were marginally less frequent than their inferences based on membership of the control categories, t(173)=2.16, p=0.03, Cohen's d=0.28.

Comparisons to chance showed that children's inferences based on religion group membership were at a rate significantly above chance level, t(173)=6.44, p<0.001, Cohen's d=0.98, while their rate of inference based on membership of the control categories did not significantly differ from chance, t(173)=1.52, p=0.13, Cohen's d=0.23, and children's rate of inference based on gender group membership was at a rate significantly below chance, t(173)=5, p<0.001, Cohen's d=0.76. Overall, these main findings indicate that children in NI treated religion group membership as the strongest basis for inference and gender group membership as the weakest basis for

inference. Membership of the control categories was intermediate in inductive potential and did not differ from chance levels of responding.

The data was further analyzed by conducting paired sample t tests within each age group in each educational context (Bonferroni adjusted, p=0.002). The results indicate that children within each educational context did not distinguish between the three dimensions at 6-7 years of age. Children aged 6-7 years attending Catholic maintained schools treated membership of religion categories (M=4.37, SD=1.54) and membership of the control categories (M=4.26, SD=1.63) as equivalent in their inductive potential, t(18)=0.19, p=0.85, Cohen's d=0.07. They also treated religion group membership and gender group membership (M=3.37, SD=2.09) as equivalent in their rate of inference, t(18)=1.33, p=0.201, Cohen's d=0.54, and membership of gender categories and the control categories were also treated as equivalent in their inductive potential, t(18)=1.14, p=0.27, Cohen's d=0.47.

Children aged 6-7 years attending State Protestant schools also did not distinguish between religion category membership (M=4.16, SD=1.61) and membership of the control categories (M=4.47, SD=1.78), t(18)=0.51, p=0.62, Cohen's d=0.18, or between religion group membership and gender group membership (M=3.37, SD=2.03), t(18)=1.07, p=0.3, Cohen's d=0.43, in their rates of inference. They also treated gender group membership and membership of the control categories as equally useful bases for inference as well, t(18)=1.39, p=0.18, Cohen's d=0.58.

Likewise, 6-7 year old children attending integrated schools also treated religion group membership (M=4.53, SD=2.01) as equivalent to membership of the control categories (M=3.68, SD=1.57), $t(18)=1.15$, p=0.27, Cohen's d=0.47, and membership of gender categories (M=3.79, SD=1.65), $t(18)=0.96$, p=0.35, Cohen's d=0.4, in inductive potential, and they rated the inductive potential of gender group membership as equivalent to control category membership also, $t(18)=0.18$, p=0.86, Cohen's d=0.07.

At 8-9 years of age, children attending Catholic maintained schools made inferences based on membership of religion categories (M=5.7, SD=1.75) more frequently than they did based on membership of gender categories (M=3.05, SD=1.9), $t(19)=3.63$, p=0.002, Cohen's d=1.45, or membership of the control categories (M=3.25, SD=1.65), $t(19)=3.89$, p=0.001, Cohen's d=1.44. Their rate of inference based on gender group membership did not differ from their rate of inference based on membership of the control categories, $t(19)=0.29$, p=0.78, Cohen's d=0.11.

The 8-9 year old children attending State Protestant schools also treated religion group membership (M=5.85, SD=1.53) as inductively more potent than gender group membership (M=2.85, SD=2.03), $t(19)=4.84$, $p<0.001$, Cohen's d=1.67, and membership of the control categories (M=3.3, SD=2.3), $t(19)=3.42$, p=0.003, Cohen's d=1.31. Gender group membership and membership of the control categories were treated as equally useful bases for inference, $t(19)=0.5$, p=0.63, Cohen's d=0.21.

Children attending integrated schools showed a different pattern from segregated school children at 8-9 years of age. They made as many

inferences based on religion group membership (*M*=4.9, *SD*=1.97) as they did based on membership of the control categories (*M*=3.85, *SD*=1.95), *t*(19)=1.42, *p*=0.17, Cohen's *d*=0.54. They also treated gender group membership (M=3.25, SD=2.1) as equivalent to membership of the control categories in inductive potential, *t*(19)=0.76, p=0.46, Cohen's d=0.3. Children made marginally more inferences based on religion group membership than they did based on gender group membership, *t*(19)=2.07, *p*=0.053, Cohen's *d*=0.81.

At 10-11 years of age, children attending Catholic maintained schools made more inferences based on membership of religion categories (*M*=5.41, *SD*=2.15) than they did based on membership of gender categories (*M*=3.18, *SD*=1.63), *t*(16)=2.85, *p*=0.012, Cohen's *d*=1.17, and membership of the control categories (*M*=3.41, *SD*=2.03), *t*(16)= 2.14, *p*=0.48, Cohen's *d*=0.96. They treated gender group membership and membership of the control categories as equivalent in their inductive potential, *t*(16)=0.32, *p*=0.75, Cohen's *d*=0.12.

Likewise, 10-11 year old children attending State Protestant schools also made inferences based on membership of religion categories (*M*=5.15, *SD*=1.63) more frequently than they did based on gender group membership (*M*=3.3, *SD*=1.56), *t*(19)=2.98, *p*=0.008, Cohen's *d*=1.16, and membership of the control categories (*M*=3.55, *SD*=1.57), *t*(19)=2.56, *p*=0.019, Cohen's *d*=1, and they treated gender group membership as equally useful as membership of the control categories, *t*(19)=0.42, *p*=0.68, Cohen's *d*=0.16, as a basis for inference.

In contrast to this, 10-11 year olds attending integrated schools made inferences based on religion group membership (*M*=4.35, *SD*=2.43) as frequently as they did based on gender group membership (*M*=3.3, *SD*=1.56), *t*(19)=1.01, *p*=0.32, Cohen's *d*=0.51, and membership of the control categories (*M*=3.55, *SD*=1.57), *t*(19)=0, *p*=1, Cohen's *d*=0.39, and they treated gender group membership and the membership of the control categories as equivalent in their inductive potential, *t*(19)=1.52, *p*=0.15, Cohen's *d*=0.16.

3.3.3. Two way analyses of variance conducted for each dimension

Three separate between-groups, 3 (Age Group: 6-7, 8-9, 10-11 years) x 3 (Educational Context: State controlled, Catholic maintained, Integrated) ANOVAs were conducted on children's inference scores; one for each of the three dimensions presented in this study (i.e., religion, gender and the control categories).

The analysis of children's inferences based on religion group membership revealed a main effect of age group on children's religion based inferences, *F*(2, 165)=5.38, *p*=0.005, $\eta_{2partial}$=0.061. There was no significant effect of educational context, *F*(2, 165)=1.52, *p*==0.22, $\eta_{2partial}$=0.02, and there was no significant interaction between age group and educational context on children's rate of inference, *F*(4, 165)=0.9, *p*=0.47, $\eta_{2partial}$=0.02). Bonferroni corrected pairwise comparisons showed that 8-9 year old children made inferences more frequently based on religion than 6-7 year old children (*p*=0.004), but 8-9 year olds did not differ from 10-11 year olds in their rate of

inference (p=0.37), and 10-11 year olds did not differ from 6-7 year olds (p=0.27).

The analysis of children's inferences based on gender group membership revealed that there was no significant effect of age, $F(2, 165)=0.8$, p=0.45, $\eta_{2partial}$=0.01, or educational context, $F(2, 165)=0.0.35$, p=0.71, $\eta_{2partial}$=0.004, on children's gender based inferences, and there was no significant interaction between age and educational context, $F(4, 165)=0.09$, p=0.99, $\eta_{2partial}$=0.002.

The analysis of children's inferences based on membership of the control categories showed no significant effect of age group, $F(2, 165)=2.1$, p=0.13, $\eta_{2partial}$=0.03, or educational context on children's rate of inference, $F(2, 165)=0.47$, p=0.63, $\eta_{2partial}$=0.006, and there was no significant interaction between age group and educational context on children's rate of inference either, $F(4, 165)=1.39$, p=0.24, $\eta_{2partial}$=0.03.

3.3.4. Comparisons to chance

Comparisons to chance (Chance=4), which can be seen in Figure 4, were conducted to examine children's rate of inference, collapsed across trial type, for each dimension, within each age group and educational context. This analysis revealed that at all ages, from 6-11 years of age, children within the integrated context did not use any of the dimensions as a basis for inference at a rate that significantly differed from chance level (Religion based inferences: $t(18)=1.14$, p=0.27, Cohen's d=0.54, Gender based inferences: $t(18)=0.56$, p=0.59, Cohen's d=0.26, Control category based inferences: $t(18)=0.88$, p=0.39, Cohen's d=0.41).

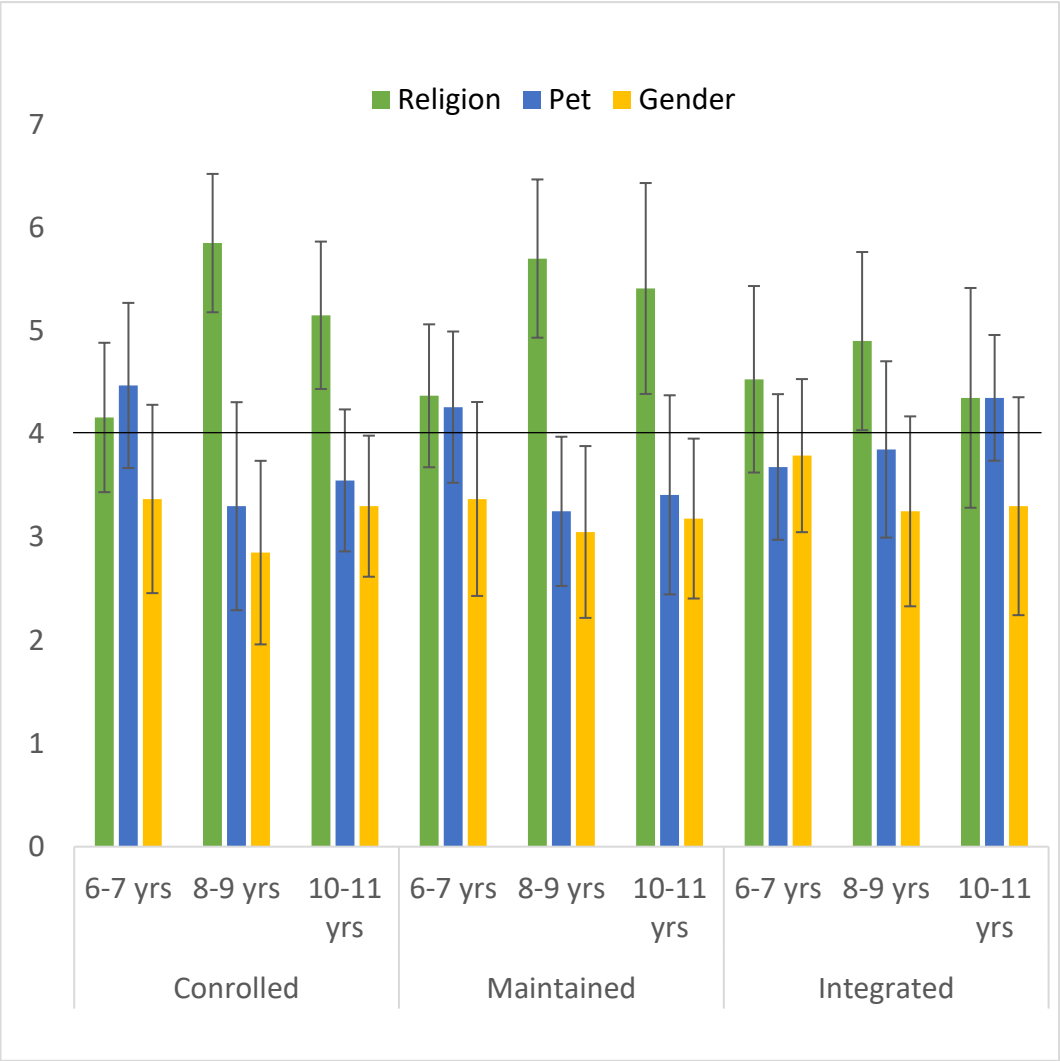


Figure 4. Children's mean rate of inference (out of 8) at each age group within each school in Study 1 (Chance=4). Error bars represent 95% confidence intervals.

In the context of the maintained schools, children aged 6-7 years did not make inferences based on any of the three dimensions at a rate that significantly differed from chance level (Religion based inferences: $t(18)=1.05$, $p=0.31$, Cohen's $d=0.49$, Gender based inferences: $t(18)=1.32$, $p=0.2$, Cohen's $d=0.62$, Control category based inferences: $t(18)=0.71$,

p=0.49, Cohen's *d*=0.33), and in the context of the controlled schools 6-7 years olds also did not make inferences based on any three dimensions at a rate that significantly differed from chance level (Religion based inferences: *t*(18)=0.43, *p*=0.67, Cohen's *d*=0.2, Gender based inferences: *t*(18)=1.35, *p*=0.19, Cohen's *d*=0.64, Control category based inferences: *t*(18)=1.16, *p*=0.26, Cohen's *d*=0.55). .

At 8-9 years of age, Catholic maintained children made inferences based on religion category membership at a rate greater than chance level, *t*(19)=4.34, p<0.001, Cohen's *d*=1.99, they made inferences based on gender category membership that was at a rate significantly lower than chance level, *t*(19)=2.23, p=0.038, Cohen's *d*=1.02, and their rate of inference based on membership of the control categories did not significantly differ from chance, *t*(19)=2.03, *p*=0.056, Cohen's *d*=0.93. Likewise, 8-9 year olds in controlled schools made inferences based on religion group membership at a rate significantly greater than chance, *t*(19)=5.4, p<0.001, Cohen's *d*=2.48, they made inferences based on gender group membership at a rate that was significantly below chance level, *t*(19)=2.53, p=0.02, Cohen's *d*=1.16, and their rate of inference based on membership of the control categories did not significantly differ from chance, *t*(19)=1.36, p=0.189, Cohen's *d*=0.62.

The 10-11 year olds in maintained schools made inferences based on religion category membership at a rate that was greater than chance level, *t*(16)=2.7, p=0.016, Cohen's *d*=1.35, they made inferences based on gender group membership at a rate significantly below chance level, *t*(16)=2.08, p=0.054, Cohen's *d*=1.04, and they made inferences based on membership

of the control categories that did not significantly differ from chance level, $t(16)=1.19$, $p=0.25$, Cohen's $d=0.6$. The 10-11 year olds in controlled schools made inferences based on religion group membership at a rate that was greater than chance level, $t(19)=3.15$, $p=0.005$, Cohen's $d=1.45$, and they made inferences based on gender group membership, $t(19)=2.01$, $p=0.059$, Cohen's $d=0.92$, and membership of the control categories, $t(19)=1.28$, $p=0.216$, Cohen's $d=0.59$, at a rate that that did not significantly differ from chance.

Thus, from 8 to 11 years of age, children who attended de facto segregated schools preferred to make inferences based on membership of religion categories (Catholic and Protestant) at a rate greater than chance level, whereas children attending integrated schools did not prefer any of the three dimensions as a basis for inference.

3.3.5. Comparisons to chance within each set of triads

Comparisons to chance (chance=2), which can be seen in Table 2, were also examined for each set of triads – the conflict between religion categories and gender categories, the conflict between religion categories and the control categories, and the conflict between gender categories and the control categories.

At 8-9 years of age the results showed that for triads presenting a conflict between religion group membership and gender group membership, children attending Catholic schools preferred to make inferences based on

Table 2. Comparisons to chance for each triad type within each age group and school in Study 1.

Triad Type	Age	School	Comparisons to chance (chance=2)
Religion & Gender	6-7 yrs	Catholic	$t(18)=1.41$, $p=0.18$, $d=0.66$
		State	$t(18)=0.47$, $p=0.64$, $d=0.22$
		Integrated	$t(18)=1.56$, $p=0.14$, $d=0.74$
	8-9 yrs	Catholic	$t(19)=3.33$, $p=0.004$*, $d=1.53$
		State	$t(19)=4.22$, $p<0.001$*, $d=1.94$
		Integrated	$t(19)=2.11$, $p=0.05$*, $d=0.97$
	10-11 yrs	Catholic	$t(16)=4.76$, $p<0.001$*, $d=2.38$
		State	$t(19)=1.69$, $p=0.11$, $d=0.78$
		Integrated	$t(19)=1$, $p=0.33$, $d=0.46$
Religion & Pet	6-7 yrs	Catholic	$t(18)=0.2$, $p=0.85$, $d=0.09$
		State	$t(18)=0.00$, $p=1$, $d=0$
		Integrated	$t(18)=0.00$, $p=1$, $d=0$
	8-9 yrs	Catholic	$t(19)=2.89$, $p=0.01$*, $d=1.33$
		State	$t(19)=2.6$, $p=0.02$*, $d=1.19$
		Integrated	$t(19)=1$, $p=0.33$, $d=0.46$
	10-11 yrs	Catholic	$t(16)=1.1$, $p=0.29$, $d=0.55$
		State	$t(19)=2.41$, $p=0.03$*, $d=1.11$
		Integrated	$t(19)=0.17$, $p=0.87$, $d=0.08$
Gender & Pet	6-7 yrs	Catholic	$t(18)=0.72$, $p=0.48$, $d=0.34$
		State	$t(18)=1.92$, $p=0.07$, $d=0.91$
		Integrated	$t(18)=1.03$, $p=0.32$, $d=0.49$
	8-9 yrs	Catholic	$t(19)=0.16$, $p=0.87$, $d=0.07$
		State	$t(19)=0.15$, $p=0.88$, $d=0.07$
		Integrated	$t(19)=0.47$, $p=0.64$, $d=0.22$
	10-11 yrs	Catholic	$t(16)=0.55$, $p=0.59$, $d=0.28$
		State	$t(19)=1.05$, $p=0.31$, $d=0.48$
		Integrated	$t(19)=1.29$, $p=0.21$, $d=0.59$

* indicates rates of inference that significantly differed from chance (2).

membership of religion categories (M=2.9, SD=1.21) at a rate significantly above chance, and they projected properties on the basis of gender category membership (M=1.1, SD=1.21) at a rate that fell significantly below chance level. Likewise, 8-9 year olds attending Protestant schools made inferences based on religion category membership (M=3.1, SD=1.17) at a rate significantly above chance level, while their rate of inference based on gender group membership (M=0.9, SD=1.17) fell below chance level. With 8-9 year olds attending integrated schools, children made inferences on the basis of religion group membership (M=2.6, SD=1.27) at a rate that was marginally greater than chance level, and their rate of inference on the basis of gender group membership (M=1.4, SD=1.27) fell marginally below chance.

At 10-11 years of age, a different pattern of responding was found. Only children attending Catholic schools made inferences based on religion category membership (M=2.41, SD=1.54) that was at a rate significantly above chance level, and they made inferences based on gender group membership (M=1.59, SD=1.54) that fell significantly below chance level. The 10-11 year olds attending Protestant and Integrated schools did not distinguish between the two dimensions in this way; their rates of inference based on religion group membership and gender group membership did not significantly differ from chance level.

The conflict between religion group membership and membership of the control categories:

At 6-7 years of age, children within each educational context made inferences based on both categories at a rate that did not differ from chance level when presented with these trials.

When 8-9 year olds were presented with these triads, the 8-9 year olds attending Catholic schools made inferences based on religion group membership (M=2.8, SD=1.24) at a rate that was significantly greater than chance, while making inferences based on membership of the control categories (M=1.2, SD=1.24) at a rate that fell significantly below chance. Likewise, 8-9 year olds attending Protestant schools also made inferences based on religion category membership (M=2.75, SD=1.29) at a rate that was significantly above chance level, while their rate of inference on the basis of membership of the control categories (M=1.25, SD=1.29) fell significantly below chance level. Children aged 8-9 years, attending integrated schools, did not significantly differ from chance level in their rate of inference on the basis of either of the dimensions presented in these triads.

At 10-11 years of age, only children attending Protestant schools projected properties on the basis of religion category membership (M=2.7, SD=1.3) at a rate that was significantly greater than would be expected by chance, while their projection of properties on the basis of membership of the control categories (M=1.3, SD=1.3) was at a rate that fell significantly below chance. The 10-11 year olds, within the Catholic school context and the integrated school context, did not make inferences on the basis of either dimension at a rate that significantly differed from chance level when presented with this set of triads.

The conflict between gender group membership and membership of the control categories:

Again, at 6-7 years of age, children within each educational context did not make inferences at a rate that differed from chance levels based on either of these dimensions when presented with these trials. The same pattern of results was also found with 8-9 year olds in each educational context, as well as 10-11 year olds within each educational context, when presented with this set of triads.

3.3.6. Effect of children's own religion group membership on their religion based inferences.

To examine the possible effect of children's own religion group membership on their religion based inferences, two 3 (Religion Group Membership: Catholic, Protestant, No religion) x 2 (Base & Target Religion: Catholic, Protestant) mixed ANOVAs were carried out on the data collected from the segregated sector and the integrated sector. There was a large enough group of children in both educational sectors, whose parents identified them as having no religion, that could also be included in the analyses of children's own religion affiliations on their inferences.

As the forced choice method used in this study could only measure levels of inference based on one category relative to another category, it is not possible to independently examine children's projections between a base and target that had different religion group memberships. The analysis could

only explore children's different rate of inference between trials when the base and target were both Catholic, and trials when the base and target were both Protestant. This is because children's inferences when the base and target had different religion group memberships may have been based on the shared gender or control category memberships of the base and target rather than being based on reasoning about religion.

Within the segregated school sector, 50 children were identified as Catholic by their parents, 39 children were identified as Protestant by their parents, and 17 children were identified as having no religion group membership by their parents. The analysis of variance of the segregated sector revealed that there was no significant main effect of the shared religion group membership of the base and target on children's rate of inference, $F(1, 103)=0.08$, $p=0.78$, $\eta_{2partial}=0.001$, greenhouse-geisser corrected, and there was also no significant interaction between children's own religion group membership and the shared religion group membership of the base and target in their rate of inference $F(2, 103)=0.53$, $p=0.59$, $\eta_{2partial}=0.01$, greenhouse-geisser corrected.

Within the integrated school sector, 17 children were identified as Catholic by their parents, 11 children were identified as Protestant by their parents, and 22 children were identified as having no religion group membership by their parents. Like the findings from the segregated sector, the analysis of variance within the integrated sample showed that there was no significant main effect of the shared religion group membership of base and target on children's rate of inference, $F(1, 47)=0.01$, $p=0.11$, $\eta_{2partial}=0.01$, greenhouse-geisser corrected, and there was no significant interaction

between children's own religion group membership and the shared religion group membership of the base and target on children's rate of inference, $F(2, 47)=0.01$, $p=0.17$, $\eta 2partial=0.01$, greenhouse-geisser corrected.

3.4. Discussion

Our initial predictions were based on the findings from the extensive developmental case study of ethnic essentialism conducted in Israel (e.g., Birnbaum et al., 2010; Deeb et al., 2011). Based on the Israeli findings, it was expected that children aged 6-11 years old in NI would display evidence of stronger essentialist beliefs about ethno-religious categories than about other categories. It was predicted that the strength of children's essentialist thinking about religion categories would decline in later childhood around 10-11 years of age, and it was predicted that this reduction in religion essentialism would occur at an earlier stage within the integrated school sector. Possible differences between Catholic and Protestant children in their essentialist thinking was also expected based on the ethnic group differences found between Israeli children (i.e., Birnbaum et al., 2010; Deeb et al., 2011; Diesendruck and Haber, 2009).

The results of this first study in NI revealed that religion was the most essentialised social dimension as expected; children were more willing to make novel inferences on the basis of shared membership in the religion categories *Catholic* or *Protestant*, than they were on the basis of shared gender group membership or shared membership of control categories (ownership of a goldfish or a hamster). This is in line with children's strong

essentialist reasoning about ethnicity in Israel, a country where ethnicity is imbued with strong social significance (Birnbaum et al., 2010; Deeb et al., 2011; Diesendruck, Birnbaum et al., 2013; Diesendruck, Goldfein-Elbaz et al., 2013; Diesendruck and ha Levi, 2006; Diesendruck & Haber, 2009). Likewise, ethno-religion categories are of the greatest social significance in NI (Gillespie, 2010), and a strong essentialist bias appears to apply to these categories here in childhood.

However, unlike the case study in Israel and contrary to our prediction, the results of the current study indicate that essentialist beliefs about religion in NI emerge at a later stage in development. Children in NI privileged religion categories as the strongest basis for inference from 8 years of age. The youngest children in this study, at 6-7 years of age, did not prefer any category as a basis of inference and so were equally as likely to project a property from religion, gender or the control category. This was found irrespective of educational context; no children at 6-7 years of age appeared to essentialise religion groups. In contrast to this, children in Israel displayed evidence of essentialist thinking about ethnicity from as young as 5 years of age, and so their essentialist bias about ethnicity seems to be in place before they start school (Birnbaum et al., 2010; Deeb et al., 2011; Segall et al., 2015). Perhaps the later onset of religion essentialism in NI, as indexed by the current study, is not so surprising given that research by Connolly and colleagues in NI reported that only about one third of 6-7 year olds appear to have concepts of religion categories that they personally identify with. Thus, it may not be until around 8 years of age that most children in NI have fully developed concepts of religion categories that an essentialist bias might be

applied to, despite children's developing awareness of NI markers associated with religion categories from around 3 years of age.

As well as suggesting a later emergence of religion essentialism in NI compared to Israel, the results of the present study also found a different effect of educational context compared to Israel. Contrary to the prediction that integrated education would have a moderating effect on essentialist beliefs about religion, the findings indicated that children attending integrated schools did not develop strong essentialist beliefs about religion group membership in the first place, while segregated school children did. From 8-11 years of age, children who attended Catholic Maintained and State Controlled (Protestant) schools treated shared membership in religion categories as the strongest basis for inference, while children in integrated schools did not distinguish between religion, gender or the control category when deciding to draw an inference. This would suggest that homogenous schools in NI, which are mainly attended by children from either the Catholic or Protestant community, might foster an essentialist bias about these religion categories. Integrated schools, on the other hand, which create an environment of greater social diversity and promote an ethos of inclusion and respect (see Gallagher, 2010; Hewstone et al., 2005; O'Connor, 2002; Smith, 2001), might encourage children not to privilege information about social category membership in their reasoning about others.

On the other hand, the differences observed between the integrated and segregated sectors might also be driven by the SES of the children; children attending segregated schools in the current study had lower SES than the children attending integrated schools (i.e., percentage of children

receiving free school meals was 61% in the State Controlled schools, 48% in the Catholic maintained schools, and 16% in the integrated schools). As SES poses a potential confound with educational context in this study, it is not clear whether educational context or SES may be driving the differences observed between segregated and integrated school children.

The final hypothesis put forward that differences between ethno-religion groups in NI might exist in children's essentialist reasoning, as has been found between ethnic groups in Israel (Birnbaum et al., 2010; Deeb et al., 2011), was not supported by the present study. There were no differences found between Catholic children, Protestant children, or children whose parents advised they had no religion.

In addition to the main findings, the current study also found a surprising pattern of response to gender and the control categories in the inference task. Gender appeared to be a relatively impotent basis for inference; children were more willing to draw inferences on the basis of membership in the control categories than gender. This is contrary to what was expected; the control categories of goldfish or hamster ownership were intended to act as a relatively meaningless dimension for grouping people along, because neither is a natural category (like gender) nor a category with richly clustered properties. Thus, it was assumed that being a hamster or a goldfish owner would present as the weakest basis for inference. However, while some research has shown that gender has been essentialised as a highly natural category with strong innate potential, heritability, and stability (particularly regarding physical properties) (i.e., Gelman et al., 1986; Taylor, 1996; Taylor et al., 2009), other studies examining essentialist beliefs about

how informative gender is, using inference tasks, have found that gender seems to have lower inductive potential than other categories (i.e., Birnbaum et al., 2010; Diesendruck & ha Levi, 2006; Taylor & Gelman, 1993).

Diesendruck and colleagues report that in Israel, gender was a weaker basis for inference than ethnicity and social status. Taylor and Gelman (1993) reported that while gender was a more salient dimension than age for children, age was treated as the stronger basis for inductive inference. In a commentary on social essentialism, Waxman (2012) pointed out that gender might not be as inductively powerful for children as other categories, such as race and ethnicity, because gender is strongly emphasised to young children and so is likely to be an overfamiliar dimension for them. As such, children may have more knowledge and experience of gender categories, and so might not see it as a particularly useful basis for inference. This is one possible explanation for children's tendency to privilege the control category over gender in the current study.

Another explanation is that the results of this study may be specific to the forced choice inference task that was employed, rather than to the social and cultural input received by children in NI, and the various educational settings within it. The forced-choice task required children to choose between information about membership in competing social dimensions when deciding whether to make an inference about the target character that was presented. As a result of this, it was only possible to measure the rate of children's inferences for each dimension *relative* to another dimension – so inferences based on shared membership in religion categories were always measured relative to children's rate of inference based on shared

membership in gender or control categories. Due to this, the apparent strength of children's essentialist beliefs about religion compared to the other dimensions may have been inflated because children were required to choose a category.

Moreover, the inductive impotence of gender in this study (and other studies elsewhere, i.e., Birnbaum et al., 2010; Taylor & Gelman, 1993) might only exist when it is presented alongside other categories. Therefore, the results of the current study will need to be replicated before any firm conclusions can be drawn from them about children's essentialist reasoning about social categories in Northern Ireland. This is the aim of the second study of this thesis; to establish whether the pattern of inference detailed in this chapter is replicable using a different inference task, which does not force children to choose between social dimensions when drawing inferences. The next study will seek to establish the validity of the current results, that from 8 years of age, ethno-religion categories are strongly essentialised social categories in NI for children attending *de facto* segregated – but not integrated – schools.

Chapter 4: Study 2

4.1. Introduction

The research detailed in the preceding chapter of this thesis constitutes the starting point of a case study examining the development of children's essentialist thinking about social categories in Northern Ireland (NI). As outlined in the previous study, a forced choice inference task, based on a similar task used in Israel (i.e., Birnbaum et al., 2010; Diesendruck & ha Levi, 2006), was employed as an indirect measure of children's essentialist beliefs about the distinctiveness of religion, gender and control categories (ownership of a goldfish or a hamster) in NI.

The findings that emerged from this study suggested that children in NI hold stronger essentialist beliefs about religion categories than they do about gender or control categories. This is similar to findings regarding ethnic essentialism in childhood in the Israeli studies. However, unlike the Israeli studies, children's essentialist beliefs about religion categories seemed to develop later, and educational context had a different type of effect from the one observed in Israel (Birnbaum et al., 2010; Deeb et al., 2011; Diesendruck, Goldfein-Elbaz et al., 2013; Segall et al., 2015). Essentialist beliefs about religion category membership appeared to emerge at 8 years of age among children who attended segregated schools, while children who attended integrated schools did not seem to privilege information about membership in any categories.

One limitation of the previous study is that the forced choice design of the inference task could only reveal the inductive potential of each dimension relative to another dimension. Children did not have the option of drawing as many inferences as they might have been preferred based on membership in

each social category, thereby obscuring their absolute level of inference for religion, gender and the control categories. As a result, the previous study, due to the use of a forced choice design, may have overestimated children's preference for religion based inferences while, at the same time, underestimating children's preference for inferences based on gender. The current study aims to replicate the results of the previous study, and also address this limitation by giving children the opportunity to draw as many inferences as they like on the basis of shared category membership in any of the three categories presented to them. Another limitation of the previous study was that the socio-economic status (SES) of the children tested posed a potential confound in interpreting the effect of educational context observed in Study 1; children attending segregated schools were likely to have been of lower SES than children attending integrated schools in Study 1, based on the percentage of free school meals recorded for each school type.

4.1.1. The current study

In order to measure children's absolute levels of inference based on religion, gender and the control categories in the present study, the inductive inference task has been modified to eliminate the imperative to choose between information about competing category memberships. Similar to the inference task conducted by Gelman and Markman (1987) that was described in Chapter 1, the current inference task will invite children to project a novel property from one base character to a target character. The task is comprised of 12 trials that can be broken down into three sets of stimuli (each set of stimuli consists of four trials); one set presents children

with information about religion and gender, one set presents information about religion and the control categories, and one set presents information about gender and the control categories. Each trial varies by whether the base and target characters share membership of two social categories, share membership in one social category, or do not share membership of any social categories at all. For example, in a stimuli set that presents information about religion and gender, the base character might be a Catholic boy in all four trials, but the target would change. In one trial, the target would also be a Catholic boy (membership in two categories would be shared). In another trial, the target would be a Catholic girl (religion group membership would be shared). In another trial, the target would be a Protestant boy (gender group membership would be shared). In another trial, the target would be a Protestant girl (there would be no shared membership in either categories). Children can decide to either project a property between each base and target character, or not project a property. The advantage of this is that the task not only will be sensitive enough to detect children's preference for one social dimension over another when drawing inferences (i.e., by comparing children's rate of inference for each social dimension in trials where the base and target shared membership of each category), but it also can demonstrate whether children seem to essentialise these categories, as indexed by their willingness to draw novel inferences at all. Furthermore, the current study may show a different pattern of inference based on gender and the control categories, compared to the forced choice task; gender might be used as a stronger basis for inference when children do not have to choose between it and the other categories.

Based on the findings from the preceding study, it was expected that children in NI will display stronger evidence of essentialist thinking about ethno-religion categories, than about gender or the control categories. It is predicted that essentialist reasoning about religion will emerge at 8 years of age, at a later stage than has been found by the case study in Israel (Birnbaum et al., 2010; Deeb et al., 2011), and this will be found within segregated schools. Integrated school children will not appear to privilege any social dimension as a basis for inference. Based on the previous study, it is also predicted that there will be no evidence of differences between Catholic and Protestant children in their essentialist reasoning about ethno-religion categories, in contrast to ethnic group differences found in Israel (Birnbaum et al., 2010; Deeb et al., 2011).

4.2. Method

4.2.1. Participants

The participants were 165 children, aged 6 to 11 years, recruited from three different educational contexts and tested with written parental consent, as well as the verbal assent of all children involved. Children were recruited from State controlled (majority Protestant), Catholic maintained (majority Catholic), and Integrated schools (religiously mixed), in Northern Ireland. See Table 3 for a further breakdown of the sample. The percentage of children receiving free school meals in each school was similar in the current sample, ranging from 20-28%, removing the potential confound between SES and educational context in this study. Ethical approval for this study can be found in Appendix 2.

Table 3. Further information about the sample in Study 2.

School Type	Age Group	Religion	Percentage of Students Receiving Free or Subsidized Meals
State-Controlled	6-7 years old: N=18 8-9 years old: N=20 10-11 years old: N=18	Catholic: 0% Protestant: 87% Other/Mixed: 9% Not Religious: 4%	20%
Catholic-Maintained	6-7 years old: N=17 8-9 years old: N=21 10-11 years old: N=16	Catholic: 94% Protestant: 2% Other/Mixed: 2% Not Religious: 2%	28%
Integrated	6-7 years old: N=18 8-9 years old: N=19 10-11 years old: N=18	Catholic: 53% Protestant: 9% Other/Mixed: 5% Not Religious: 33%	24%

4.2.2. Materials and Design

Children were presented with 3 blocks or sets of coloured pictures portraying child characters, accompanied by verbal labels highlighting the group memberships of the characters depicted in the illustrations. Set 1 conveyed religion category membership and gender category membership, Set 2 conveyed religion category membership and membership of the control categories (i.e., pet ownership), and Set 3 conveyed gender category membership and control category membership (see Table 4 for a breakdown). The order of set presentation was counterbalanced across participants.

Each stimulus set consisted of a base picture and four target pictures. On each of the four individual trials using these pictures, children were presented with the base picture on all four occasions and were invited to project a novel property from the base picture to four different target pictures in turn. Across each set of trials, the target varied by whether it shared membership of two categories with the base, membership of one category with the base, or membership of no categories with the base. An example of this can be seen in Figure 5; each target picture in a set varies by the category memberships it does and does not share with the base. Also see Table 4 for a further breakdown of the categories shared by the base and target in each stimulus set. As Study 2 did not present children with a choice to make between conflicting category information as in Study 1, the current task allowed us to measure children's absolute levels of inference, rather than children's rate of inference on the basis of one dimension relative to another.

As in Study 1, children received verbal labels for each of the three dimensions presented, and gender group membership was the only dimension that children received pictorial cues for. The visual stimuli were similar to the stimuli used in the previous study; in this study the pictures were drawn using a computer and in Study 1 the pictures were drawn by hand. (See Figure 5 for an example of the stimuli used for Set 1, which presented children with trials about religion categories and gender categories). Again, gender was presented with the characters being drawn clearly as either a *boy* or a *girl*, but unlike Study 1, when gender was not one of the dimensions that the experimenter was inviting the participants to

reason about, the character was presented as an androgynous silhouette. This can be seen in Set 2, with gender information obscured in the pictures (in contrast, visual cues about gender were held constant in study 1 when children were not being asked to reason about gender categories).

Rather than using different novel properties for each trial in this study, the experimenter used three novel properties – one property was used throughout each set of trials. The reason for this is because the same base picture is used for each of the four trials in a particular set; the target picture changes throughout the trials and children are invited to project the novel property possessed by the base picture to each of the target pictures. The properties were *gleeve, sproice* and *chaunch*. The assignment of these properties to particular stimulus sets was counterbalanced across participants.

4.2.3. Procedure

Children participated in the experiment in a quiet corner of the classroom after giving their verbal assent to take part. The experimenter explained to children that they would be taking part in a picture task to see how they think about other children and that there were no right or wrong answers to the questions. The script used can be seen in Figure 5. For each trial, children were presented with a base picture, they were given verbal information about the two categories that the base character belonged to, and they were told that the character possessed a novel property. A target picture was then

Table 4. A breakdown of the categories shared by the base and target in each stimulus set in Study 2[6]. The order of presentation of the targets was counterbalanced within stimulus sets and across children.

Block of Trials	Target 1	Target 2	Target 3	Target 4
Set 1: Religion & Gender	R+/G+	R+/G-	R-/G+	R-/G-
Set 2: Religion & Control	R+/C+	R+/C-	R-/C+	R-/C-
Set 3: Gender & Control	G+/C+	G+/C-	G-/C+	G-/C-

[6] Note - The letter R represents religion group membership, the letter G represents gender group membership, and the letter C represents membership of the control categories. The + sign indicates that the base and target both share membership of a particular category, and the – sign indicates that the base and target do not share membership of a particular category. For example, 'R+/G-' indicates a trial in which the base and target share membership of the same religion group but they have different gender group memberships.

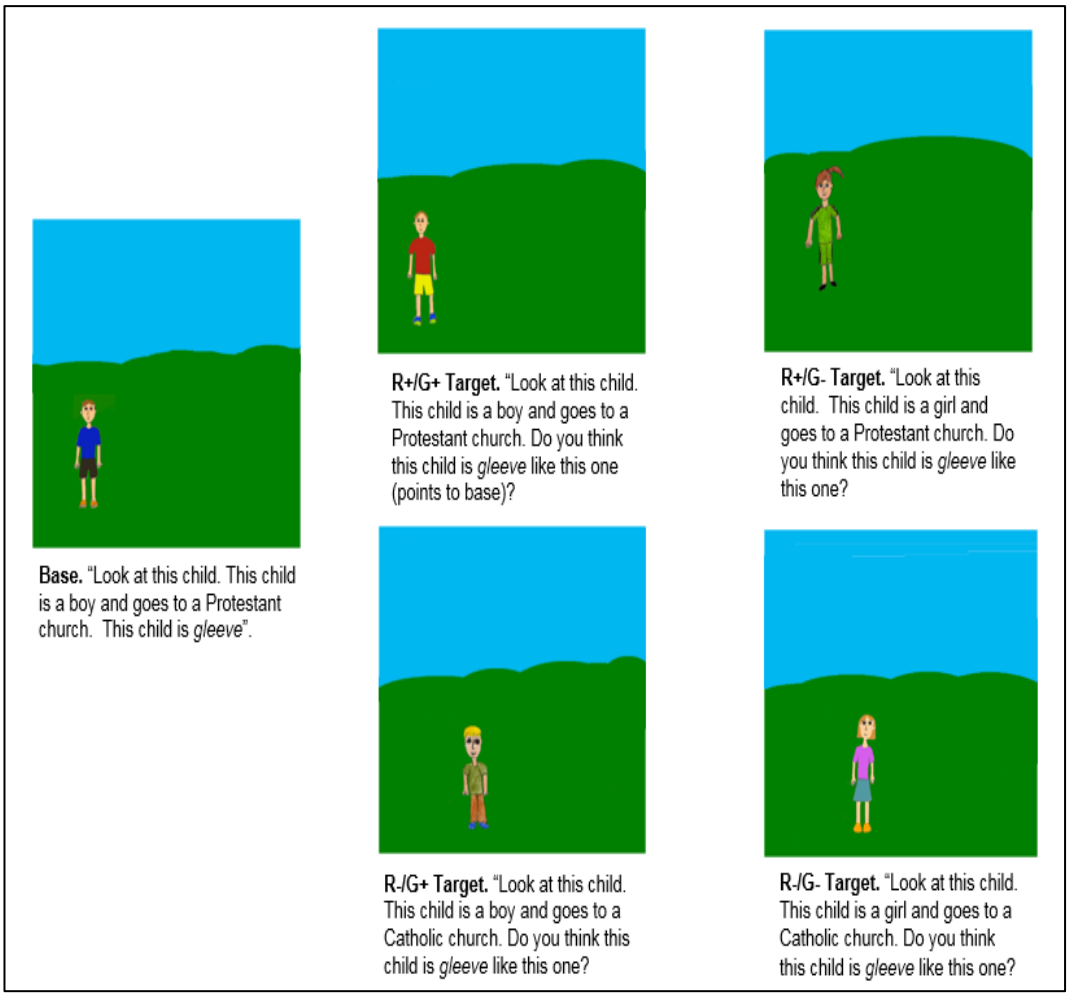


Figure 5. Stimuli used in Study 2, for Set 1, which conveys information about religion and gender. Each target picture is labelled by which dimensions are shared with the base picture (see also Table 4), for example, R+/G- indicates that this target shares religion group membership with the base, but they have different gender group memberships.

placed beside the base and children were given verbal information about the category memberships that the target either did or did not share with the base character. Children were then asked whether they thought the target shared the novel property with the base. Children were given a score of 1 for

each trial if they chose to make an inference, and a score of 0 when they did not choose to make an inference. The order of each set of triads was counterbalanced across participants, and the novel properties were counterbalanced across the sets of triads also.

4.3. Results

4.3.1 Scoring

As each stimulus set consisted of four trials, in which membership of two categories was shared by the base and target (e.g., Religion+/Gender+), or membership of one category was shared (e.g., Religion+/Gender-, Religion-/Gender+), or in which the base and target shared membership of neither categories (e.g., Religion-/Gender-), children could score a maximum of 4 in each set of trials if they chose to draw an inference in every trial. However, they could only score a maximum of two for drawing an inference on the basis of each dimension because there were only two occasions in which the base and target shared membership of one of the dimensions presented in each set. When collapsing across stimulus sets to examine children's overall rate of inference for each dimension, children had the opportunity to draw an inference when the base and a target shared membership of each dimension on four occasions (e.g., **Religion+**/Gender+, **Religion+**/Gender-, **Religion+**/Control+, **Religion+**/Control-). Thus, children could score a maximum of 4 for drawing an inference based on each dimension across the entire task.

4.3.2 Main findings

A mixed analysis of variance was conducted to examine whether there was an effect of age group (6-7, 8-9 and 10-11 years), educational context (Protestant controlled schools, Catholic maintained schools, and integrated schools), and dimension (religion, pet and gender) on children's rate of inference. The analysis revealed a significant main effect of dimension on children's rate of inference, $F(2, 312)=22.43$, $p<0.001$, $\eta^2_{partial}=0.126$. Post hoc t tests (Bonferroni adjusted, $p=0.017$) revealed that children made more inferences based on religion category membership ($M=2.61$, $SD=1.06$), $t(164)=6.82$, $p<0.001$, Cohen's $d=0.52$, and control category membership ($M=2.42$, $SD=1.11$), $t(164)=4.57$, $p<0.001$, Cohen's $d=0.34$, than they did based on gender category membership ($M=2.05$, $SD=1.08$), while children's rate of inference on the basis of religion category membership was marginally greater than their rate of inference on the basis of control category membership, $t(164)=2.042$, $p=0.043$, Cohen's $d=0.18$.

Comparisons to chance (chance=2) showed that children's rate of inference based on religion group membership, $t(164)=7.4$, $p<0.001$, Cohen's $d=1.56$, and membership of the control categories, $t(164)=4.93$, $p<0.001$, Cohen's $d=0.77$, was at a rate significantly above chance, but their inferences based on gender group membership were at a rate that did not significantly differ from chance level, $t(164)=0.58$, $p=0.565$, Cohen's $d=0.09$.

4.3.3. Effects of educational context

The results of the analysis also revealed a significant interaction between educational context and dimension on children's rate of inference, $F(4, 312)=2.66$, $p=0.033$, $\eta^2_{partial}=0.03$, and this can be seen in Figure 6. This interaction was followed up by three one-way within subject analyses of variance - one within each educational context. A main effect of dimension was found within the Catholic maintained sector, $F(2, 110)=11.17$, $p<0.001$, $\eta^2_{partial}=0.17$, and within the Protestant controlled sector, $F(2, 110)=14.68$, $p<0.001$, $\eta^2_{partial}=0.21$. Within the integrated sector there was no significant main effect of dimension, $F(2, 110)=1.68$, $p=0.19$, $\eta^2_{partial}=0.03$.

Bonferroni adjusted paired t tests ($p=0.017$) were conducted within the samples from the segregated schools. The results showed that children attending Catholic schools had a significantly higher rate of inference based on religion group membership ($M=2.5$, $SD=1.13$), $t(53)=4.79$, $p<0.001$, Cohen's $d=0.57$, than they did based on gender group membership ($M=1.85$, $SD=1.14$), and their rate of inference based on membership of the control categories ($M=2.2$, $SD=1.05$) was also higher than their rate of inference based on gender group membership, $t(53)=2.55$, $p=.01$, Cohen's $d=0.32$. Meanwhile, their rate of inference on the basis of membership of the religion categories was marginally higher than their rate of inference based on membership of the control categories, $t(53)=2.13$, $p=0.04$, Cohen's $d=0.28$. For children attending Protestant controlled schools, it was found that children made as many inferences based on religion category membership ($M=2.86$, $SD=0.96$) as they did based on membership of the control categories ($M=2.54$, $SD=1.16$), $t(55)=1.8$, $p=0.07$, Cohen's $d=0.3$, while

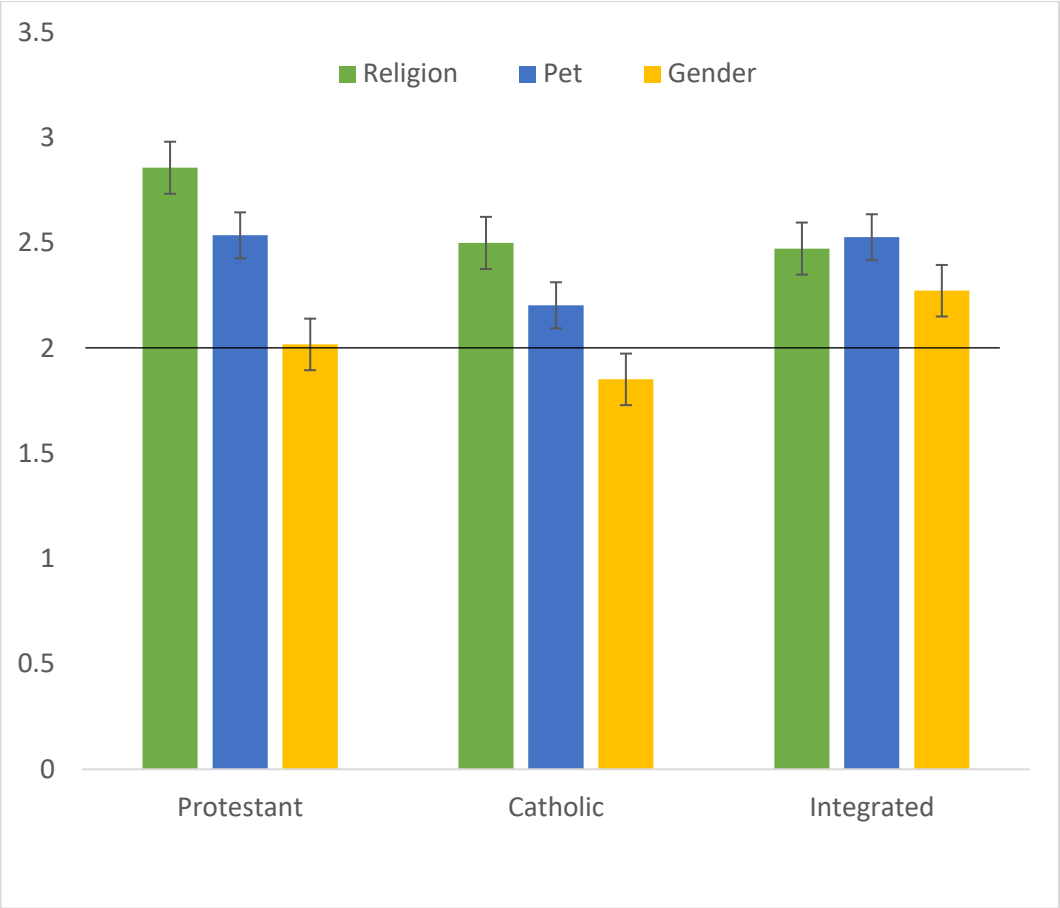


Figure 6. Mean rate of inference (out of 4) based on religion, pet and gender for each school group in Study 2. Error bars represent 95% confidence intervals.

displaying a higher rate of inference on the basis of religion group membership, $t(55)=5.67$ $p<0.001$, Cohen's $d=0.89$, and membership of the control categories, $t(55)=3.71$, $p=0.001$, Cohen's $d=0.5$, than they did based on gender group membership ($M=2.02$, $SD=0.92$).

Comparisons to chance (chance=2) revealed that Catholic maintained children's rate of inference based on religion group membership, $t(53)=3.26$, $p=0.002$, Cohen's $d=0.9$, was at a rate significantly above chance, but their

rates of inference based on membership of the control categories, $t(53)=1.42$, $p=0.161$, Cohen's $d=0.39$, and gender group membership did not significantly differ from chance, $t(53)=0.96$, $p=0.344$, Cohen's $d=0.26$. Within the Protestant controlled sample, comparisons to chance revealed that children's inferences based on religion group membership, $t(55)=6.67$, $p<0.001$, Cohen's $d=1.8$, and membership of the control categories, $t(55)=3.46$, $p=0.001$, Cohen's $d=0.93$, were at a rate that was significantly above chance level, but their rate of inference based on gender group membership did not differ significantly from chance, $t(55)=0.15$, $p=0.886$, Cohen's $d=0.04$. Within the integrated sample, it was found that children's inferences based on religion group membership, $t(54)= 3.28$, $p=0.002$, Cohen's $d=0.89$, and membership of the control categories were at a rate significantly above chance level, $t(54)=3.6$, $p=0.001$, Cohen's $d=0.98$, but their inferences based on gender group membership were at a rate that did not differ from chance, $t(54)=1.77$, $p=0.083$, Cohen's $d=0.48$.

4.3.4. Developmental trends

The analysis of variance revealed that there was a marginally significant interaction between age group and children's inferences from specific dimensions, $F(4, 312)=2.09$, $p=0.083$, $\eta 2_{partial}=0.026$, as can be seen in Figure 7. There was no significant interaction between age group, educational context and dimension, $F(8, 312)=1$, $p=0.43$, $\eta 2_{partial}=0.03$. The marginal interaction between age group and dimension was followed up by three one-way within-subjects analyses of variance to examine the effect

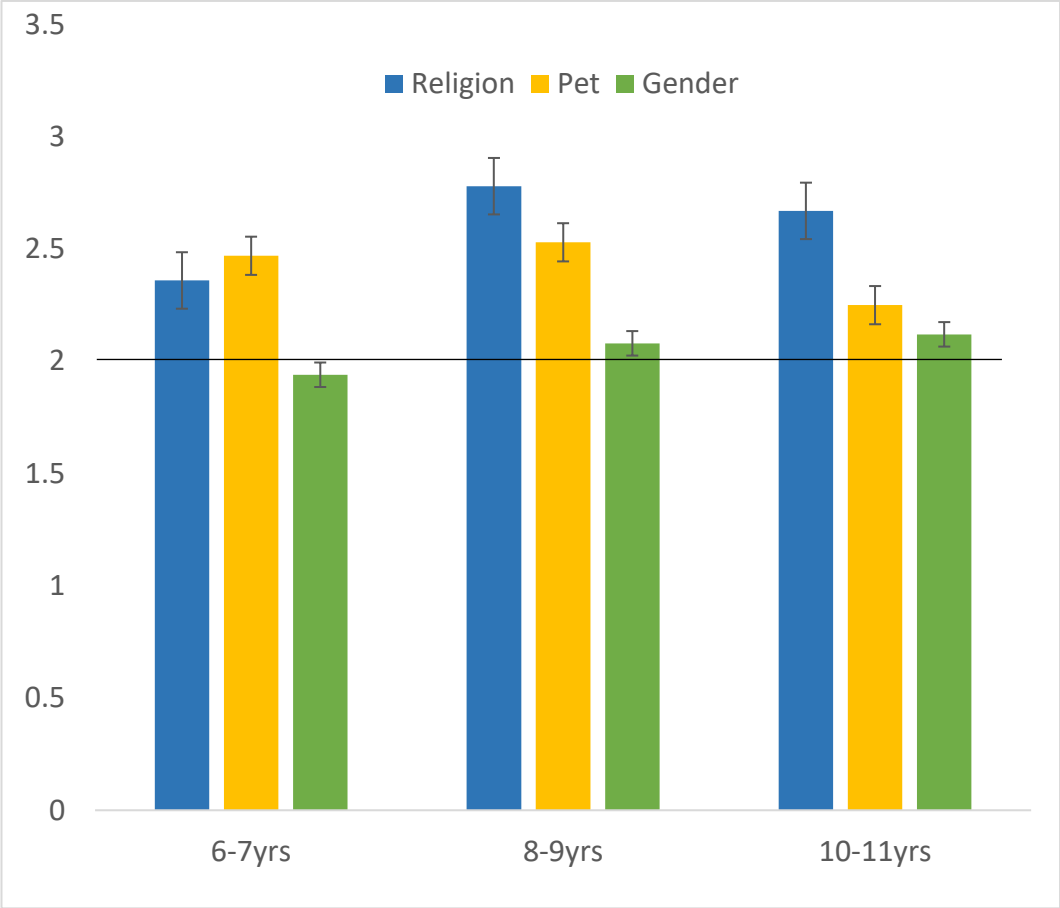


Figure 7. Mean rate of inference (out of 4) based on each dimension, within each age group in Study 2. Error bars represent 95% confidence intervals

of dimension on children's rate of inference, within each age group. The three analyses revealed significant main effects of dimension on children's inferences within all three age groups - 6-7 year olds: $F(2, 102)=7.29$, $p=0.001$, η^2partial$=0.12$, 8-9 year olds: $F(2, 102)=12.33$, $p<0.001$, η^2partial$=0.17$, 10-11 year olds: $F(2, 102)=7.11$, $p=0.001$, η^2partial$=0.12$. Post hoc, Bonferroni corrected comparisons ($p=0.017$), showed that 6-7 year olds made more inferences based on religion category membership ($M=2.36$,

SD=1.19), t(52)=3.06, p=0.01, Cohen's d=0.36, and membership of the control categories (M=2.47, SD=1.23), t(52)=3.8, p=0.001, Cohen's d=0.45, than they did based on gender group membership (M=1.94, SD=1.15), and their rate of inference based on religion group membership did not differ from their rate of inference based on membership of the control categories, *t*(52)=0.7 *p*=0.49, Cohen's *d*=0.09. One sample t-tests revealed that children's inferences based on religion group membership, *t*(52)=2.19, *SD*=0.033, Cohen's *d*=0.61, and membership of the control categories, *t*(52)=2.78, *p*=0.008, Cohen's *d*=0.77, were at a rate significantly above chance level, but their inferences based on gender were at a rate that did not significantly differ from chance, *t*(52)=0.36, *p*=0.722, Cohen's *d*=0.1.

The post hoc comparisons for children aged 8-9 years, showed a higher rate of inference based on religion group membership (*M*=2.78, *SD*=0.88), *t*(59)=4.7, *p*<0.001, Cohen's *d*=0.72, and membership of the control categories (*M*=2.53, *SD*=0.93), *t*(59)=3.38, *p*=0.001, Cohen's *d*=0.45, than their rate of inference on the basis of gender group membership (*M*=2.08, *SD*=1.05), but like the 6-7 year olds, they also did not distinguish between religion group membership and membership of the control categories in their rate of inference, *t*(59)=1.72, *p*=0.09, Cohen's *d*=0.28. Comparisons to chance showed that 8-9 year old children's rate of inference based on religion, *t*(59)=6.8, *p*<0.001, Cohen's *d*=1.77, and membership of the control categories, *t*(59)=4.45, *p*<0.001, Cohen's *d*=1.16, were above chance level, but their inferences based on gender were at a rate that did not significantly differ from chance, *t*(59)=0.62, *p*=0.54, Cohen's *d*=0.16.

For children aged 10-11 years in the present study, a different pattern from the younger age groups was found: children made more inferences based on religion group membership (M=2.67, SD=1.08) than they did based on gender group membership (M=2.12, SD=1.06), t(51)=3.95, p<0.001, Cohen's d=0.51, and they made more inferences based on religion category membership than they did based on membership of the control categories (M=2.25, SD=1.15), t(51)=2.52, p=0.015, Cohen's d=0.38. They did not distinguish between gender group membership and membership of the control categories in their rate of inference, t(51)=0.88 p=0.38, Cohen's d=0.12. Comparisons to chance showed that 10-11 year old children's rate of inference based on religion group membership was significantly above chance level, t(51)=4.5, p<0.001, Cohen's d=1.26, but their rate of inference based on membership of the control categories, t(51)=1.56, p=0.124, Cohen's d=0.44, and membership of gender categories, t(51)=0.79, p=0.436, Cohen's d=0.22, was at a rate that did not significantly differ from chance.

4.3.5. Exploratory analysis of religion-based inferences of each age group within each educational context.

While there was no significant 3 way interaction between age group, educational context, and social dimension (F(8, 312)=1, p=0.43, $\eta^2_{partial}$=0.03) found in this study, an exploratory analysis of children's religion based inferences compared to their control category based inferences revealed some interesting findings. Figure 8 shows the mean difference scores between religion based inferences and control category based inferences within each age group in each educational context. Positive scores represent

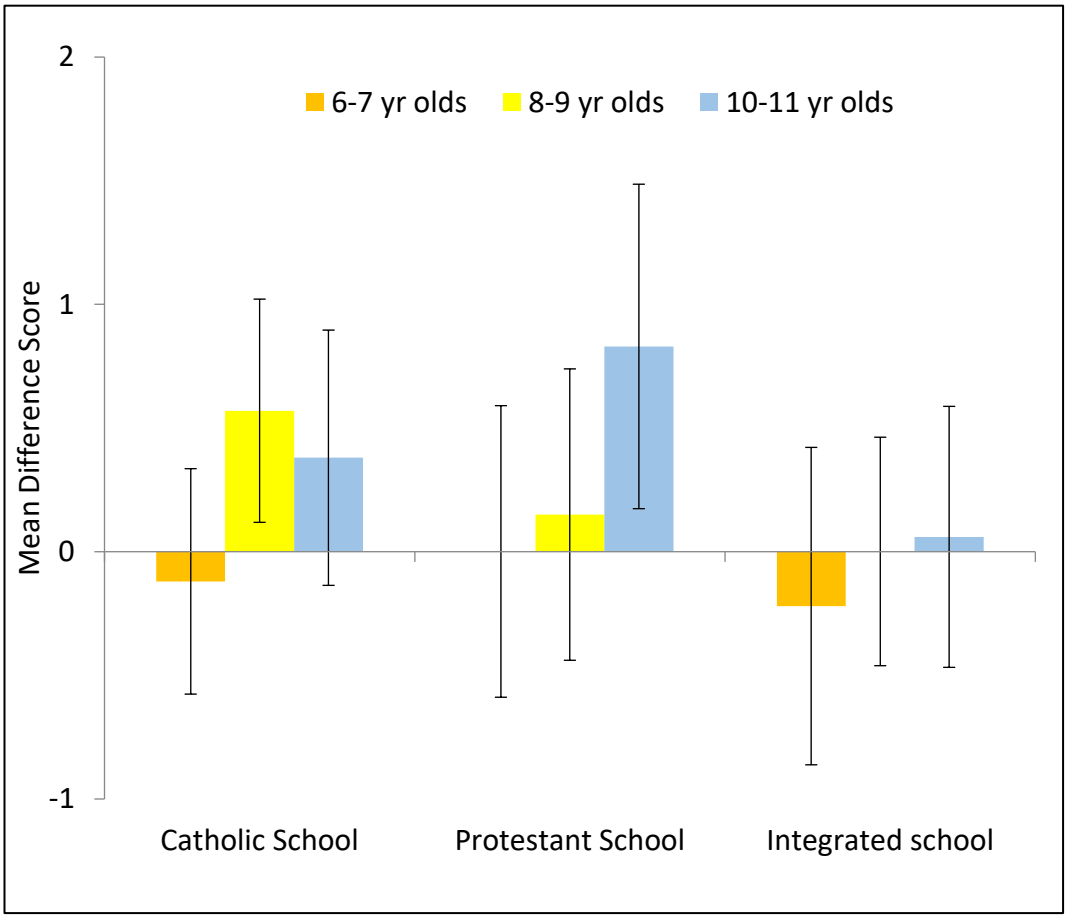


Figure 8. The mean difference scores between religion based inferences and control category based inferences, within each educational context and age group, in Study 2. Error bars represent 95% confidence intervals.

higher religion based inferences compared to control category based inferences.

Paired t tests were conducted within each age group in each educational context. Across educational context, it was found that 6-7 year old children did not distinguish between religion and the control categories in their rate of inference, Catholic Maintained: $t(16)=0.52$, $p=0.61$, Cohen's $d=0.09$, Protestant Controlled: $t(17)=0$, $p=1$, Cohen's $d=0$, Integrated:

t=(17)=0.7, *p*=0.5, Cohen's *d*=0.2. However, for older children differences were found within the segregated school context.

It was revealed that 8-9 year old children attending Catholic Maintained schools made significantly more religion based inferences than inferences based on the control categories, *t*(20)=2.55, *p*=0.019, Cohen's *d*=0.73, while 10-11 year olds did not significantly distinguish between them, *t*(15)=1.46, *p*=0.16, Cohen's *d*=0.34. Within Protestant Controlled schools, it was found that 8-9 year olds treated religion categories and the control categories as equally useful bases for inference, *t*(19)=0.51, *p*=0.61, Cohen's *d*=0.16, while 10-11 year olds made more inferences based on shared membership in religion categories than for control categories, *t*(17)=2.56, *p*=0.02, Cohen's *d*=0.8. Children attending integrated schools did not distinguish between religion and control categories as a basis for inference at any age, 8-9 year olds: *t*(18)=0, *p*=1, Cohen's *d*=0, 10-11 year olds: *t*(17)=0.21, *p*=0.83, Cohen's *d*=0.05. Overall, this exploratory analysis indicated that within the segregated educational context, 8-9 year olds attending Catholic Maintained schools privileged religion categories over control categories in their reasoning, while this emerged later at 10-11 year olds within Protestant Controlled schools.

4.3.6. Effect of children's own religion group membership on their religion based inferences.

Further analyses were carried out to examine the effect of children's own religion group membership on their rate of inference between base and

target pictures of varying religion group membership. A 2 (religion group membership: Catholic, Protestant) x 2 (base religion: Catholic, Protestant) x 2 (target religion: Catholic, Protestant) mixed analysis of variance was conducted on the data collected from segregated schools. Within the segregated school sample, 50 children were identified as Protestant by their parents and 51 children were identified as Catholic. The same analysis of children's own religion group membership could not be conducted within the integrated school sample because there were only 5 Protestant children in the sample compared to 29 Catholic children.

The analysis of the segregated sample showed that there was a significant main effect of the target religion on children's rate of inference, $F(1, 99)=127.73$, $p<0.001$, $\eta 2partial=0.56$, greenhouse-geisser corrected, with children making more generalisations to a Protestant target ($M=1.2$, $SD=0.53$) than to a Catholic target ($M=0.9$, $SD=0.52$). There was also a significant interaction (see Figure 9) between children's own religion group membership and the religion of the target, $F(1, 99)=5$, $p=0.028$, $\eta 2partial=0.05$. greenhouse-geisser adjusted. This was followed-up by two one-way Anova's examining the effect of children's own religion group membership on their rate of projection to different religious targets. It was found that there was no significant effect of children's own religion group membership on their preference for projecting novel properties to a Catholic target, $F(1, 99)=0.25$, $p=0.62$, $\eta 2partial=0.003$, or a Protestant target, $F(1, 99)=2.15$, $p=0.15$, $\eta 2partial=0.02$. However, comparisons to chance (chance=1) showed that Protestant children projected properties to a Protestant target at a rate significantly greater than chance ($M=1.28$,

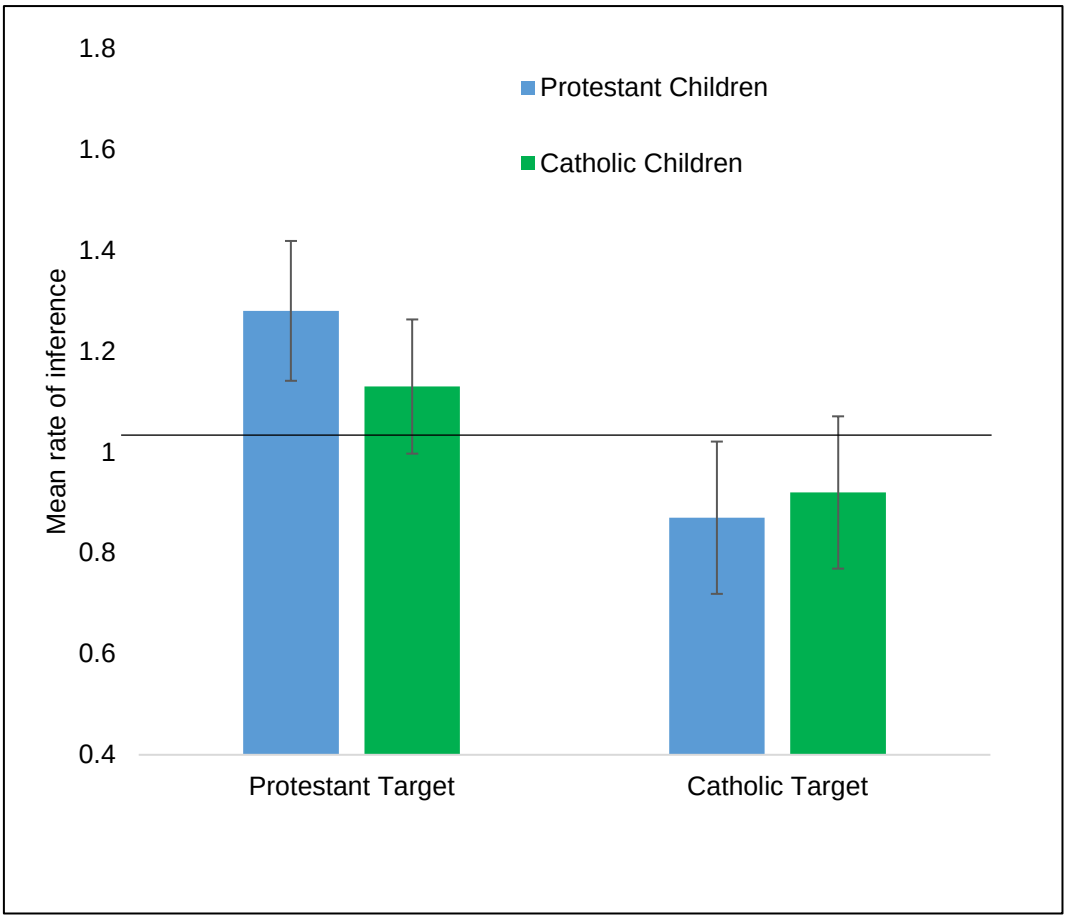


Figure 9. The interaction between children's own religion group membership and their mean rate of inference (out of 2) based on the religion group membership of the character in the target picture in Study 2. Error bars represent 95% confidence interval.

SD=0.5), t(49)=3.99, p<0.001,Cohen's *d*=1.14, but did not differ from chance in their mean rate of projection to a Catholic target (*M*=0.87, *SD*=0.48), *t*(49)=1.91, *p*=0.06, Cohen's *d*=0.55. Catholic children did not differ from chance in their rate of projection to a Catholic target (*M*=0.92, *SD*=0.55), *t*(50)=1.02, *p*=0.31, Cohen's *d*=0.29, or a Protestant target (*M*=1.13, *SD*=0.55), *t*(50)=1.67, *p*=0.1, Cohen's *d*=0.47.

There was also a significant interaction between the base religion and the target religion, $F(1, 99)=21.34$, $p<0.001$, $\eta^2_{partial}=0.18$, greenhouse-geisser corrected, on children's rate of inference, with children making more inferences between a base and target sharing the same religion than between a base and target that had different religions, which can be seen in Figure 10. Post hoc t tests showed that children projected marginally more properties between two Protestant characters (M=1.64, SD=0.78) than between two Catholic characters (M=1.25, SD=0.7), $t(109)=4.41$, $p<0.001$, Cohen's d=0.53. They also projected more properties between two Protestant characters than from a Catholic picture to a Protestant picture (M=0.76, SD=0.73, $t(109)=8.64$, $p<0.001$, Cohen's d=1.16, or from a Protestant picture to a Catholic picture (M=0.54, SD=0.69), $t(109)=11.49$, more properties from a Catholic base to a Protestant target, than from a Protestant base to a Catholic target, $t(109)=2.69$, p=0.01, Cohen's d=0.31. Comparisons to chance (chance=1) showed that children's rate of inference from a Protestant base to a Protestant target, t(109)=8.61, p<0.001, Cohen's d=1.65, and from a Catholic base to a Catholic target, t(109)=3.83, p<0.001, Cohen's d=0.73, were significantly above chance level. Their rate of inference from a Catholic base to a Protestant target, t(109)=3.4, p=0.001, Cohen's d=0.65, and from a Protestant base to a Catholic target were significantly below chance level, t(109)=7.08, p<0.001, Cohen's d=1.36.

While it was not possible to conduct an analysis of children's own religion group membership on their inferences within the integrated sector, it was still possible to look at children's base to target projections within the

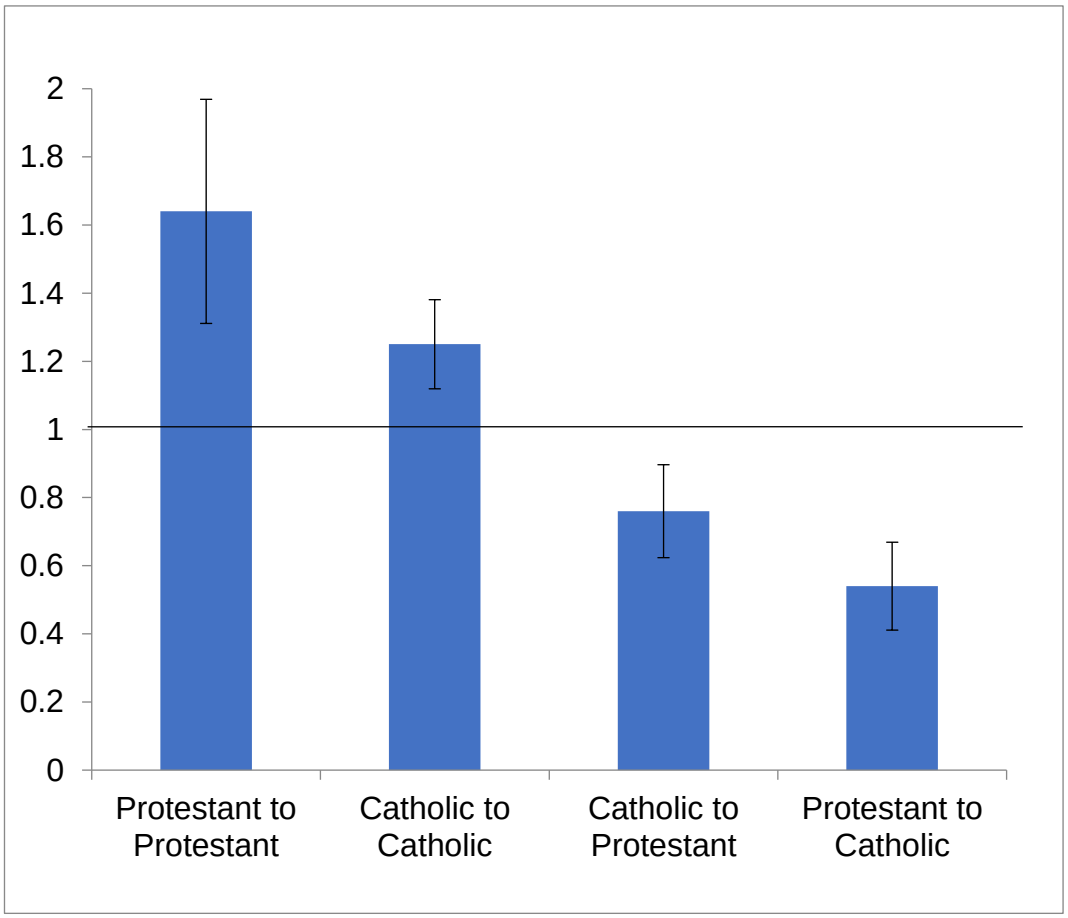


Figure 10. The interaction between the religion of the base picture and the religion of the target picture on children's mean rate of inference (out of 2) in Study 2. Error bars represent 95% confidence intervals. Children made more inferences when the base and and target shared the same religion group membership, compared to when they did not.

integrated sector as a whole. A 2 (Base religion: Catholic, Protestant) x 2 (Target religion: Catholic, Protestant) repeated measures analysis of variance was carried out. It was found that there was a significant main effect of the religion group membership of the base picture on children's rate of inference, $F(1, 54)=4.87$, $p=0.03$, $\eta^2_{partial}=0.08$, greenhouse- geisser corrected, such that participants preferred to base more inferences on a

Protestant base picture (*M*=1.11, *SD*=0.56) than on a Catholic base picture (*M*=0.92, *SD*=0.49). There was also a significant main effect of the religion group membership of the target picture on children's rate of inference, $F(1, 54)=24.22$, $p<0.001$, $\eta^2_{partial}=0.36$, greenhouse-geisser corrected. Children preferred to project more properties to a Protestant target picture (*M*=1.06, *SD*=0.51) than to a Catholic target picture (*M*=0.96, *SD*=0.54). There was no significant interaction between the religion group membership of the base and the religion group membership of the target, $F(1, 54)=1.31$, $p=0.26$, $\eta^2_{partial}=0.02$, greenhouse-geisser adjusted; integrated children were as likely to project properties between two characters who shared the same religion, as between two characters who did not.

4.4. Discussion

The aim of the present study was to replicate the results of the previous inference study conducted in Northern Ireland (NI), using a modified inference task that would allow the measurement of children's absolute level of inference on the basis of each social category presented to them (i.e., religion, gender and control categories). Based on the results of the first NI study, it was predicted that the current task would, again, reveal that children in NI essentialise ethno-religion categories more strongly than gender or the control categories. It was predicted that essentialist thinking about religion categories would emerge at 8 years of age – later than has been observed in Israeli children's essentialist reasoning about ethnicity (Birnbaum et al., 2010; Deeb et al., 2011) – and this would be observed within the segregated school

sector only. There was no expectation that Catholic children and Protestant children would differ in their essentialist reasoning about religion categories.

As expected, the results of the current study indicated that children in NI hold stronger essentialist beliefs about religion categories, as was found in the preceding study and similar to Israeli children's strong essentialist reasoning about ethnicity (Birnbaum et al., 2010; Diesendruck & ha Levi, 2006; Diesendruck & Haber, 2009). However, the current pattern of results differed from the previous study in that children's stronger preference for drawing inferences on the basis of shared religion category membership, over gender and control categories, did not seem to emerge until 10 years of age. This is later than the age of emergence found in the first study (and much later than the emergence of ethnic essentialism in Israel, Birnbaum et al., 2010), in which children displayed essentialist reasoning about religion categories from 8 years of age in NI.

In addition to the different effect of age on the emergence of essentialist reasoning about religion suggested by the current study, it was also discovered that educational context impacted differently on children's reasoning compared to Study 1. As expected, children who attended segregated schools reasoned differently about the social categories, compared to children attending integrated schools, who did not display a preference for one category over another when drawing inferences. However, children attending segregated schools drew more inferences on the basis of religion and control category memberships, than they did based on gender, which appeared to be a weak basis for inference. Furthermore, children attending Catholic maintained schools demonstrated a weak

preference for religion based inferences over control category based inferences, while Protestant controlled school children did not distinguish between them.

As in the previous study, the current one also found that children attending segregated schools were more likely to display an essentialist bias towards religion categories in NI than children attending integrated schools, who do not appear to differentiate between religion, gender and a control category in their essentialist reasoning. This finding in Study 2 indicates that differences in SES are unlikely to have produced the effect of educational context observed in Study 1, as this effect was observed in the current study despite children coming from a similar socio-economic background across educational sector in Study 2.

In addition to this, an exploratory analysis of religion, compared to control category based inferences, suggested a different effect of age within each educational context on religion-based projections. It was found that 8 year olds attending Catholic maintained schools seemed to essentialise religion categories more so than control categories, while this distinction emerged at 10 years of age in children attending Protestant Controlled schools. Integrated children from 6-11 years treated membership in religion and control categories as equally informative.

Contrary to the expectation that no group differences would emerge between Catholic and Protestant children in their essentialist reasoning about religion categories, the current study produced some puzzling results. While there were no significant differences between Protestant and Catholic

children's rate of inference to each religion target presented, comparisons to chance showed that Protestant children favoured a Protestant target picture at a rate greater than chance alone would predict, while Catholic children showed no preference for one target over another, responding at chance level when projecting to either target. It is unclear why Protestant children may have a preference for projecting to a Protestant Target picture. Thus, it will be important to see whether the effect replicates in the next experiment.

To conclude this chapter, it should be noted that the differences between Study 1 and Study 2 may be attributable to the different type of inference task used in each study. The forced choice task required children to choose between competing category information when drawing inferences, while the unconstrained inference task of Study 2 allowed children to draw as many inferences as they were willing to on the basis of shared membership in all three social categories presented to them. In order to examine whether differences between the tasks used in Studies 1 and 2 may have caused differences in the findings, the results of the present, unconstrained inference task will need to be replicated with a different sample of children in NI.

Additionally, a possible limitation of the present inference task needs to be addressed; the later emergence of essentialist reasoning about religion in NI, compared to that of ethnicity in Israel (i.e., Birnbaum et al., 2010; Deeb et al., 2011), may be caused by demands of the task. Younger children, at 6-7 years of age, may be displaying no preference for religion over the control categories when drawing inferences because the stimuli in both studies did not contain visual cues to help them track the various category memberships presented in each trial. Thus, the youngest children may not have

distinguished between religion and the control categories because they could not remember all of the information they were given. The aim of the next study is to examine whether the results of the current study are replicable, and whether including visual cues about category memberships in the task might reveal essentialist reasoning about religion categories at an earlier stage of development.

Chapter 5: Study 3

5.1. Introduction

This third study of children's essentialist reasoning in Northern Ireland (NI) consists of another inductive inference study, intended to provide an indirect measure of children's essentialist beliefs about the cohesiveness and distinctiveness of ethno-religion categories. As the previous two chapters have demonstrated, it appears that children in NI essentialise religion categories (and treat gender as uninformative), and this bias emerges late in childhood, possibly between 8 and 11 years of age, within the *de facto* segregated educational environment. While the preceding studies agree on these points, there are some areas of discrepancy between the findings of the two studies.

The forced choice inference task of Chapter 3 suggested that ethno-religion essentialism emerges at 8 years of age, while the unconstrained inference task of Chapter 4 indicates that this happens at 10 years of age. Both studies found that children attending segregated schools reasoned differently about the categories, compared to children attending integrated schools, who did not seem to privilege any social category as a basis for inference. However, while segregated school children in Study 1 essentialised religion most at 8 years of age, Study 2 indicated that only Catholic Maintained school children did this at 8 years of age and Protestant Controlled children privileged religion group membership at 10 years of age. In addition to this, no ethno-religious group differences were found between Catholic and Protestant children in Study 1, but Study 2 revealed that segregated school children from the Protestant community showed a preference for projecting properties to a Protestant target, but not to a

Catholic target, while Catholic children did not have a preference for either target. This may suggest that Protestant children in the segregated educational sector essentialise their outgroup – Catholics – more strongly than their own group, but this finding needs to be replicated.

The differences that exist between the results of these two studies may have emerged because of differences between the two inference tasks; the forced choice task measured children's relative level of inference for each social category, while the unconstrained inference task was able to measure children's absolute level of inference for each social category. However, with regards to the apparent late-emergence of essentialist reasoning about religion categories in both studies, it is speculated that 6-7 year old children might not be distinguishing between membership in religion and the control categories because this information may be hard for them track. As the stimuli that were used in Study 1 and Study 2 did not contain visual cues about the characters' memberships in religion and the control categories, the task may have been too demanding to detect differences in essentialist reasoning about these categories at 6-7 years of age.

Thus, the aim of the current study is to replicate the previous study by presenting children with the unconstrained inference task, but with visual cues about religion and control category memberships added to the stimuli. By doing this, the current study may show an earlier emergence of essentialist beliefs about religion categories in NI. It may also continue to demonstrate a pattern of late emergence, but this replication will hopefully be able to resolve some of the discrepancies between Study 1 and Study 2. These discrepancies are about the exact age when essentialist beliefs about

religion categories in NI appear, as well as how exactly educational context influences children's beliefs.

5.1.1. The current study

The current study employs the unconstrained inference task that was used in Study 2 to measure children's absolute level of inference on the basis of each of the three dimensions presented to them (i.e., religion, gender, and control categories). The only difference between the current inference task and the task used in Study 2 is that the current task includes visual cues about religion and control category memberships in the stimuli. This is to make information about religion and control category memberships easier for 6-7 year olds to remember when asked to draw an inference. Visual cues about gender category membership were present in the previous two studies, and continue to be present in the current study (except in trials where gender category membership is not presented and androgynous silhouettes were used). The same novel properties from Study 2 were used in the current task, and just like the task detailed in the previous chapter, children were shown trials of one base and one target character and were invited to project a property from the base to the target in each trial. Each trial (e.g., presenting religion and gender together) varied by whether the base and target characters shared membership of two categories (e.g., both religion and gender), membership of one category (e.g., membership in religion category shared, but different gender, and then membership of same gender category shared, but different religion), or membership in none of the

categories (e.g., different religion category memberships and different gender category memberships).

Based on the previous two studies, and similar to essentialist reasoning about ethnicity in Israel (Birnbaum et al., 2009; Deeb et al., 2011; Diesendruck & Haber, 2009), it is expected that the current study will again suggest that children in NI essentialise religion group membership more strongly than membership in gender or control categories. It is also predicted that children's essentialist reasoning about religion group membership will emerge later in childhood, between 8-11 years of age. However, due to the inclusion of visual cues about religion and control category memberships in the present stimuli, it might be expected that children could show indications of essentialising religion categories at the earlier age of 6-7 years, if the added visual cues reduce the possible demands of the task for younger children. This would be consistent with the early emergence of essentialist reasoning about ethnicity found in Israel at 5 years of age (Birnbaum et al., 2010; Deeb et al., 2011). Further to this, it is predicted that a bias towards essentialising religion categories will be influenced by attending a segregated school, while children attending integrated schools will show no preference for one category over another in their reasoning.

5.2. Method

5.2.1. Participants

The participants were 228 children, aged 6 to 11 years, recruited from three different educational contexts and tested with written parental consent,

as well as the verbal assent of all children involved. Children were recruited from State controlled (majority Protestant), Catholic maintained (majority Catholic), and Integrated schools (religiously mixed), in Northern Ireland. See Table 5 for a further breakdown of the sample. Ethical approval for this study can be found in Appendix 3.

5.2.2. Design and Materials

As the current study was a replication of the previous one, children were presented with the same task in the current study as they were in Study 2, with some minor changes to the visual stimuli. As in Study 2, children were presented with 12 trials, consisting of 3 sets of pictures depicting child characters drawn using a computer. The pictures were accompanied by verbal labels highlighting the category information that children were presented with in the task – religion categories, gender categories and control categories (pet ownership). Each set of pictures presented children with information about two dimensions: Set 1 conveyed religion categories and gender categories, Set 2 conveyed religion categories and control categories, and Set 3 conveyed gender categories and control categories. Just like the previous study, children were invited to project a novel property from a base picture to four different target pictures in turn, in each set of trials. The category memberships shared or not shared by each base and target were manipulated across trials. The order of set presentation was counterbalanced across participants.

Table 5. Further information about the sample in Study 3.

School Type	Age Group	Religion	Percentage of Students Receiving Free or Subsidized Meals
State-Controlled	6-7 years old: N=18 8-9 years old: N=27 10-11 years old: N=29	Catholic: 0% Protestant: 93% Other/Mixed: 3% Not Religious: 4%	39%
Catholic-Maintained	6-7 years old: N=30 8-9 years old: N=24 10-11 years old: N=24	Catholic: 86% Protestant: 10% Other/Mixed: 1% Not Religious: 3%	8%
Integrated	6-7 years old: N=25 8-9 years old: N=27 10-11 years old: N=24	Catholic: 42% Protestant: 26% Other/Mixed: 10% Not Religious: 22%	27%

The stimuli presented in this study differed from the previous study by presenting children with pictorial cues about religion categories and the control categories, in addition to the pictorial cues given about gender category membership. The reason for including pictorial cues for all three dimensions in this study was to reduce the cognitive demands placed on children by making the categories more salient. In the current study, religion categories were represented by two visually distinct drawings of a church to symbolise the two religion categories of interest – *Catholic* and *Protestant*. The different shapes of each church were intended to represent how Catholic and Protestant churches differ in reality, but children did not necessarily have to realise this because they were also be provided with the category labels.

Pet ownership was conveyed by drawings of a *hamster* or a *goldfish* in the pictures to indicate which pet the character in the picture owned. As

before, gender was presented with characters was being drawn as either a *boy* or a *girl*, or as androgynous silhouettes for Set 2 when gender was not one of the social dimensions involved in these trials. See Figure 11 for an example of the stimuli used for Set 1 (presenting religion categories and gender categories), and Figure 12 for an example of the stimuli used for Set 2 (presenting religion categories and the control categories).

The same three novel properties used in the previous study were used in this experiment, they were presented as novel attributes and one property was used for each stimulus set. The properties were *gleeve, sproice* and *chaunch*. These properties were counterbalanced across each set of trials for each participant.

5.2.3. Procedure

Children participated in the experiment in a quiet corner of the classroom after giving their verbal assent to take part. Written parental consent was obtained for each child who participated. The experimenter explained to children that they would be taking part in a picture task to see how they think about other children and that there were no right or wrong answers to the questions. The script used can be seen in Figures 11 and 12,

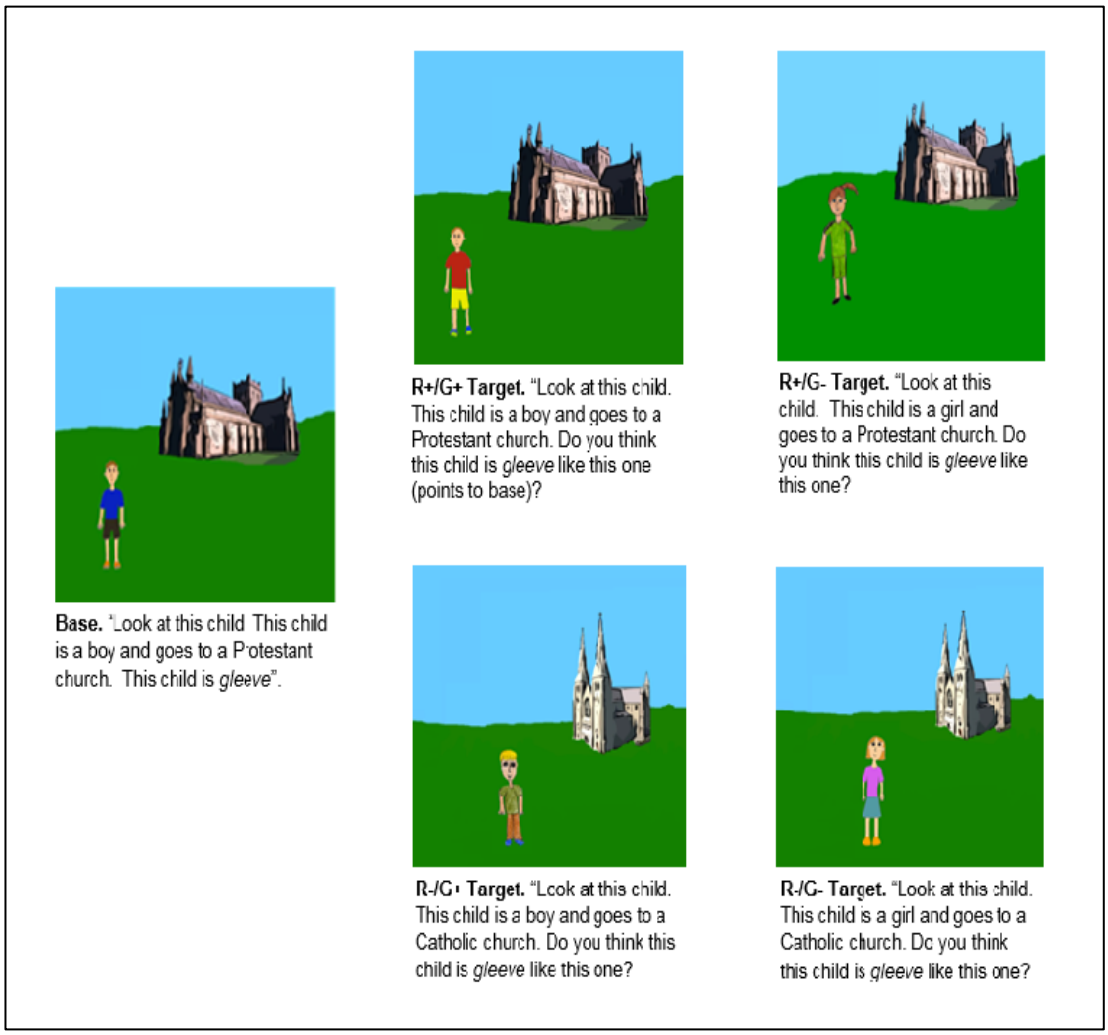


Figure 11. Stimuli used in study 3, for Set 1, which conveys information about religion category memberships and gender category memberships. Each target picture is labelled by which social categories it shares with the base, for example, R+/G- indicates that that this target shares religion but not gender with the base.

and is identical to the script used in Study 2. Just as before, in Study 2, children were presented with 12 trials consisting of a base picture and a target picture. They were given verbal information, in addition to the visual

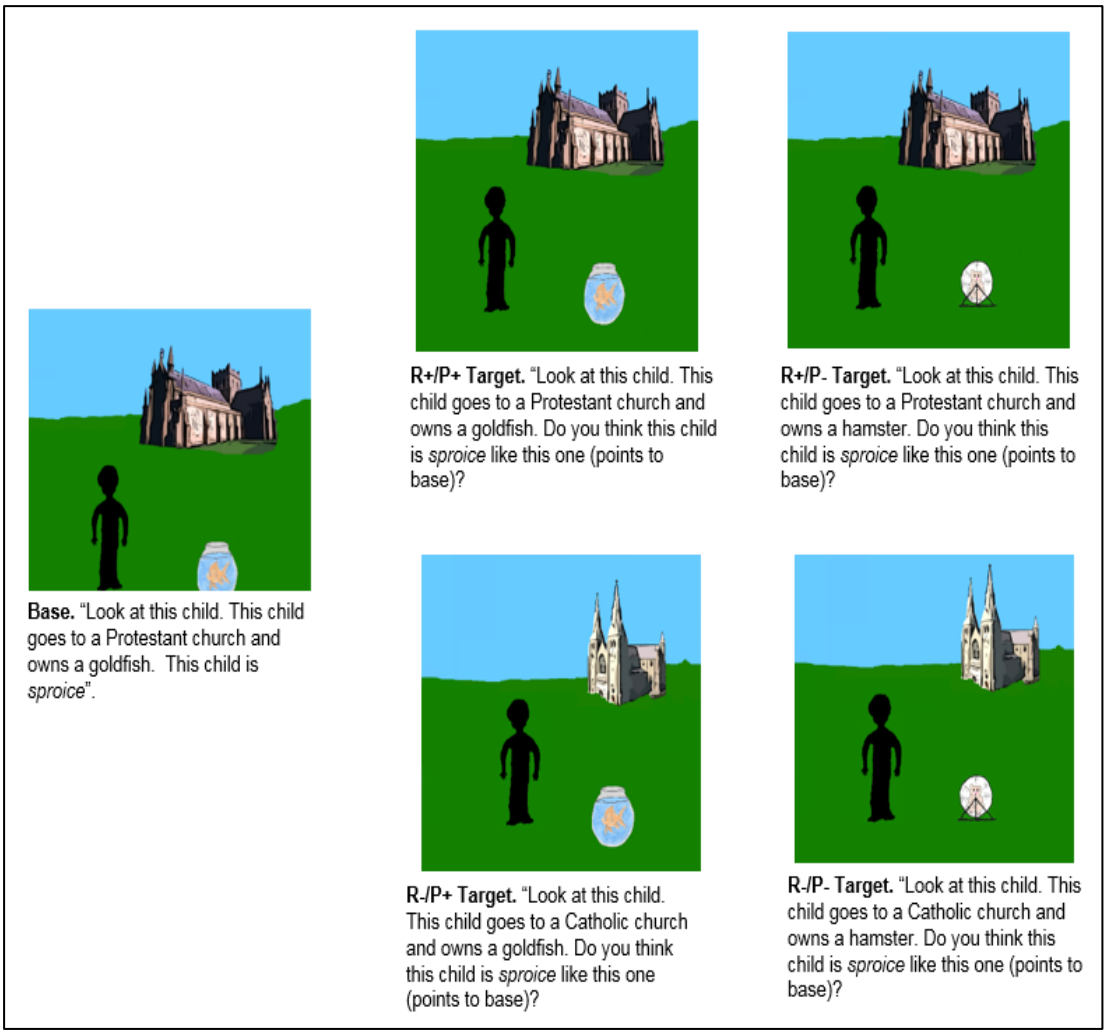


Figure 12. Stimuli used in study 3, for Set 2, which conveys information about religion category membership and control category membership. Each target picture is labelled by which category memberships it shares with the base - for example, R+/C- indicates that this target shares religion group membership with the base, but they own different pets. As gender is not presented in Set 2, the characters have been presented as androgynous silhouettes to obscure gender.

cues in the stimuli, about the category memberships that the base and target characters did or did not share. Children were then invited to project a novel property from the base picture to each of four target pictures presented in each set of trials. Children were given a score of 1 for each trial in which they chose to project a property, and they were given a score of 0 for each trial in which they chose not to project a property. The order that the category information was presented in was counterbalanced across the trials, as well as the novel properties, and the sets of trials were counterbalanced across participants.

5.3. Results

5.3.1 Scoring

Scoring was the same as in the previous study. With a total of 12 trials, consisting of three different sets of four trials (i.e., trials presenting religion categories and gender categories, trials presenting religion categories and control categories, and trials presenting gender categories and control categories), children could score a maximum of 4 for each dimension when collapsing across trials, because there were four occasions on which children had the option of making an inference based on each dimension (e.g., religion is shared four times in the following trials: **R+**/G+, **R+**/G-, **R+**/C+, **R+**/C-). Children's overall scores for each dimension were analysed.

5.3.2 Main findings

A 3 (Age group: 6-7 years, 8-9 years, 10-11 years) x 3 (School context: Catholic, Integrated, Protestant) x 3 (Dimension: religion categories, gender categories, control categories) mixed analysis of variance was carried out on children's inference scores and revealed a significant main effect of dimension, $F(1.88, 411.86)=55.07$, $p<0.001$, $\eta^2_{partial}=0.2$, greenhouse-geisser corrected. Post hoc paired t tests (Bonferroni adjusted $p=0.017$) were conducted and they showed that children made more inferences based on religion group membership ($M=2.82$, $SD=1.08$), $t(227)=10.14$, $p<0.001$, Cohen's $d=0.72$, and membership of the control categories ($M=2.44$, $SD=0.97$), $t(227)=6.24$, $p<0.001$, Cohen's $d=0.39$, than they did based on gender category membership ($M=2.05$, $SD=1.05$), and they also made more inferences based on membership of religion categories than they did based on the membership of the control categories, $t(227)=5.08$, $p<0.001$, Cohen's $d=0.37$. One sample t tests (chance=2) revealed that children's religion, $t(227)=11.37$, $p<0.001$, Cohen's $d=1.51$, and pet-based inferences, $t(227)=6.85$, $p<0.001$, Cohen's $d=0.91$, were at a rate significantly above chance level, while their inferences based on gender group membership, $t(227)=0.76$, $p=0.45$, Cohen's $d=0.1$, were at a rate that did not significantly differ from chance.

There was no significant interaction between school context and dimension, $F(3.76, 411.86)=0.24$, $p=0.9$, $\eta^2_{partial}=0.002$, greenhouse-geisser corrected, and there was no significant three-way interaction between age group, school context and dimension on children's rate of inference, $F(7.52, 411.86)=0.99$, $p=0.44$, $\eta^2_{partial}=0.18$, greenhouse-geisser corrected.

5.3.3. Developmental effects

While there was no significant interaction between educational context and dimension found, the analysis did reveal a marginal interaction between age group and dimension on children's rate of inference, $F(3.76, 411.86)=2.36$, $p=0.056$, $\eta^2_{partial}=0.02$, greenhouse-geisser corrected. This was followed up by three one-way Anova's examining children's rate of inference based on each social dimension within each age group. Figure 13 shows the trends within each age group. The results showed a significant main effect of social dimension on 6-7 year olds' rate of inference, $F(2, 144)=31.44$, $p<0.001$, $\eta^2_{partial}=0.30$. Post hoc paired t tests were conducted and it was found that 6-7 year old children made more inferences based on religion group membership ($M=2.74$, $SD=1.13$), $t(72)=7.11$, $p<0.001$, Cohen's $d=0.83$, and membership of the control categories ($M=2.51$, $SD=1.06$), $t(72)=6.65$, $p<0.001$, Cohen's $d=0.64$, than they did based on gender group membership (M=1.82, SD=1.1), while they did not significantly distinguish between religion category membership and membership of the control categories, t(72)=1.83, p=0.07, Cohen's d=0.21, in their rate of inference. Comparisons to chance were conducted and it was found that 6-7 year olds made significantly more inferences based on religion group membership, t(72)=5.59, p<0.001, Cohen's d=1.32, and membership of the control categories, t(72)=4.1, p<0.001, Cohen's d=0.97, than would be expected by chance, but their inferences based on gender group membership, t(72)=1.39, p=0.17, Cohen's d=0.33, were at a rate that did not significantly differ from chance.

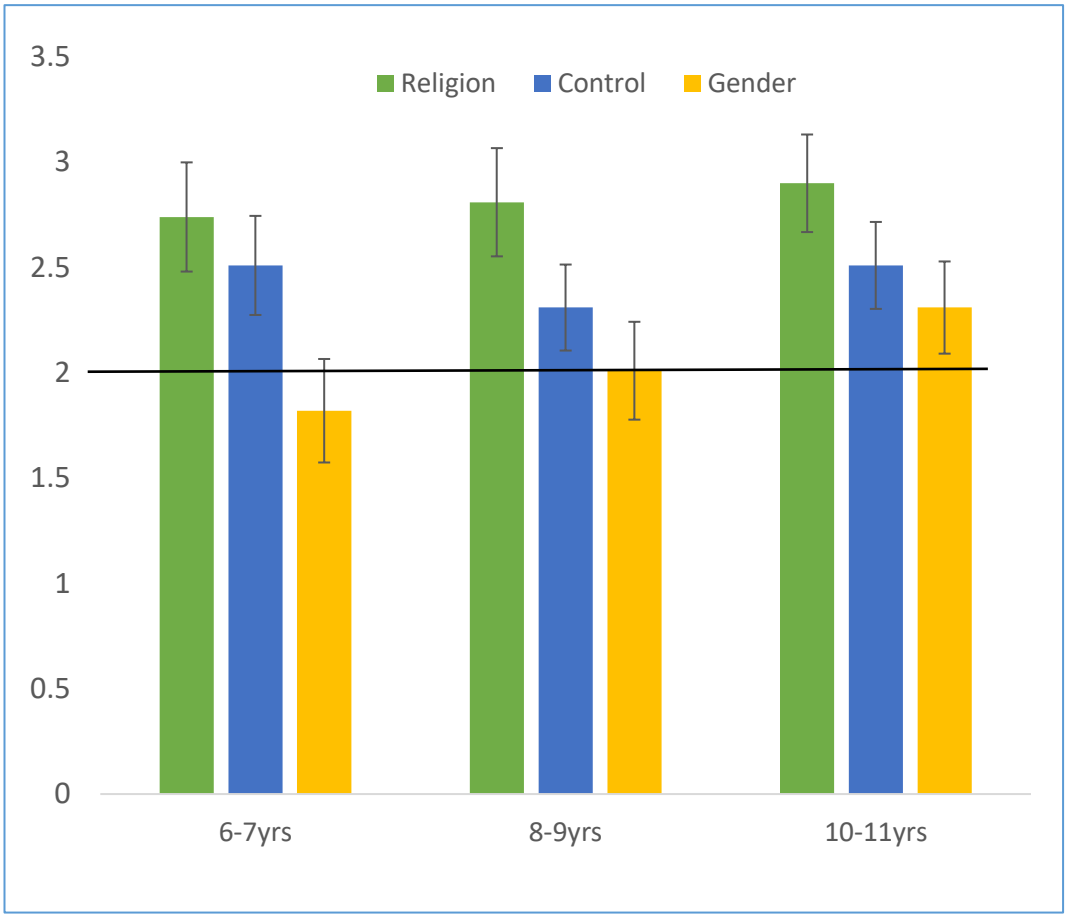


Figure 13. Mean rate of inference (out of 4) based on each dimension in comparison to chance (chance=2), within each age group in Study 3. Error bars represent 95% confidence intervals.

The results of the Anova for 8-9 year olds also revealed a significant main effect of social category on children's rate of inference, $F(2, 154)=21.52$, $p<0.001$, $\eta^2_{partial}=0.22$. At 8-9 years of age, children preferred to make more inferences based on religion- ($M=2.81$, $SD=1.12$) than they did based on control category membership ($M=2.31$, $SD=0.92$), $t(77)=3.81$, $p<0.001$, Cohen's $d=0.49$, or membership of gender categories ($M=2.01$, $SD=1.04$), $t(77)=6.2$, $p<0.001$, Cohen's $d=0.74$, while making marginally more inferences based on membership of the control categories than based

on gender group membership, $t(77)=2.77$, $p=0.007$, Cohen's $d=0.31$. Single sample t tests showed that 8-9 year olds' inferences based on religion category membership, $t(77)=6.39$, $p<0.001$, Cohen's $d=1.46$, and membership of the control categories, $t(77)=2.97$, $p=0.004$, Cohen's $d=0.68$, were at a rate significantly above chance level, and their inferences based on gender group membership, $t(77)=0.11$, $p=0.91$, Cohen's $d=0.03$, did not significantly differ from chance.

Finally, the Anova for the 10-11 year old age group showed a significant main effect of social dimension of children's inferences, $F(2, 152)=11.91$, $p<0.001$, $\eta^2_{partial}=0.14$. The 10-11 year old children preferred to make more inferences based on religion category membership ($M=2.9$, $SD=1$) than they did based on gender group membership ($M=2.31$, $SD=0.98$), $t(76)=4.41$, $p<0.001$, Cohen's $d=0.6$, or membership of the control categories ($M=2.51$, $SD=0.93$), $t(76)=3.07$, $p=0.003$, Cohen's $d=0.4$, but they did not distinguish between membership of the control categories and membership of gender categories, $t(76)=1.86$, $p=0.067$, Cohen's $d=0.21$, in their rate of inference. One sample t tests revealed that 10-11 year olds' based inferences on religion group membership, $t(76)=7.8$, $p<0.001$, Cohen's $d=1.79$, membership of the control categories, $t(76)=4.8$, $p<0.001$, Cohen's $d=1.1$, and membership of gender categories, $t(76)=2.8$, $p=0.006$, Cohen's $d=0.64$, at a rate that was significantly higher than chance.

5.3.5. Effect of children's own religion group membership on children's religion based inferences.

To explore the effect of children's own religion group membership on their rate of projection between base and target pictures of varying religion group membership, two 2 (religion group membership: Catholic and Protestant) x 2 (base religion: Catholic, Protestant) x 2 (target religion: Catholic, Protestant) mixed analyses of variance were conducted within each educational context. Within the segregated sample, 67 children were identified as Catholic by their parents and 78 children were identified as Protestant by their parents. In the integrated sample, 32 children were identified as Catholic by their parents, 20 children were identified as Protestant by their parents, and 17 children were described as having no religion by their parents (as the 'no religion' group of children was a respectable size, this group was also included in the analysis).

The analysis of the segregated school sample displayed a significant main effect of the base religion group membership on children's rate of inference, $F(1, 143)=5.46$, $p=0.021$, $\eta^2_{partial}=0.04$, greenhouse-geisser corrected, and a significant main effect of the target religion group membership, $F(1, 143)=154.58$, $p<0.001$, $\eta^2_{partial}=0.52$, greenhouse-geisser corrected. Children made more inferences from a Protestant base picture (M=1.02, SD=0.48) than they did from a Catholic base picture (M=0.92, SD=0.46). They also projected more properties to a Protestant target (M=1, SD=0.48) than to a Catholic target (M=0.95, SD=0.49). There was no significant interaction between the religion of the base picture and the religion of the target picture on children's rate of inference, $F(1, 143)=0.96$, $p=0.33$,

$\eta^2_{partial}$=0.01, greenhouse-geisser adjusted. There were also no significant interaction between children's own religion group membership and their rate of inference (Base x Own religion interaction: F(1, 143)=1.77, p=0.19, $\eta^2_{partial}$=0.01, greenhouse-geisser corrected, Target x Own religion interaction: F(1, 143)=0, p=0.99, $\eta^2_{partial}$=0, greenhouse-geisser adjusted, Base x Target x Own religion interaction: F(1, 143)=0.47, p=0.5, $\eta^2_{partial}$=0.003, greenhouse-geisser corrected).

With regards to the integrated sample, the analysis of variance showed a main effect of the religion group membership of the target on children's rate of inference, F(1, 66)=72.04, p<0.001, $\eta^2_{partial}$=0.52, greenhouse-geisser corrected, with children preferring to project more properties to a Protestant target picture (M=0.99, SD=0.45) than to a Catholic target picture (M=0.92, 0.53). There was no significant main effect of the base on children's rate of inference, F(1, 66)=2.43, p=0.12, $\eta^2_{partial}$=0.04, greenhouse-geisser corrected, and there were no two-way or three-way interactions between children's own religion group membership and their projections from the base or to the target (Base x own religion interaction: F(1, 66)=0.59, p=0.56, $\eta^2_{partial}$=0.017, greenhouse-geisser corrected, Target x own religion interaction: F(1, 66)=0.29, p=0.75, $\eta^2_{partial}$=0,01, greenhouse-geisser adjusted, Base x Target x own religion interaction: F(1, 66)=0.39, p=0.68, $\eta^2_{partial}$=0.012, greenhouse-geisser corrected).

5.4. Discussion

The current study of children's essentialist reasoning about social categories in Northern Ireland (NI) employed the unconstrained inference task detailed in Study 2, with the addition to the stimuli of visual cues representing memberships in religion and the control categories. The presentation of visual cues about memberships in all three categories – religion, gender, and control categories – was intended to make these social dimensions more salient for 6-7 year old children, who might possibly have found the task too cognitively demanding when expected to track category memberships during the task using verbal information alone (with the exception of gender, which was represented pictorially and verbally in all three inference studies).

It was predicted that the current study would again indicate strong essentialist thinking about religion in NI, but this might emerge earlier than 8-10 years of age when religion and the control categories were made more salient and easier to track with visual cues. It was also expected that integrated school children would show no preference for religion categories, while children attending segregated schools would.

The main finding that, overall, religion was the strongest dimension for inference compared to gender and the control categories, emerged more strongly in this study (similar to Study 1) than in Study 2. This is in line with the hypothesis, and with the case study conducted in Israel, which demonstrated that ethnicity was essentialised more strongly than other categories by children there (Birnbaum et al., 2010; Deeb et al., 2011; Diesendruck & ha Levi, 2006; Diesendruck, Goldfein-Elbaz et al., 2013; Diesendruck & Haber, 2009).

However, in contrast to the Israeli findings, the current study continued to suggest that the emergence of essentialist thinking about religion categories in NI occurs later in childhood. Children aged 6-7 years still did not distinguish between religion and the control categories as a basis for inference, despite the inclusion of visual cues to represent these dimensions. It was at 8-9 years of age that children privileged religion group membership when drawing inferences and 10-11 year olds displayed this preference also.

Thus, the current study seems to resolve the discrepancy between Study 1 and Study 2 with regards to the onset of strong essentialist reasoning about ethno-religion categories in NI. The present study suggests that the emergence of religion essentialism occurs at 8 years of age, rather than 10 years of age. This is supported by research suggesting that while children start to show an awareness of signs and symbols associated with religion group membership in NI from the age of 3, it is not until middle to late childhood that children appear to have an understanding of religion categories and even identify with them. Therefore, 6-7 year old children in the current research might not be distinguishing between religion and the control categories as a basis for inference because the labels *Catholic* and *Protestant* may be relatively novel for most children. The control categories (ownership of a goldfish or a hamster) may also seem highly novel to younger children, as owning a goldfish or a hamster is not a meaningful distinction that would normally be drawn between people. The possible novelty of these two dimensions may have made them an interesting basis for inference. Meanwhile gender, which continued to have weak inductive potential, is an overly familiar dimension for young children, so their

extensive experience with this category may have made it a weak basis for novel inference (for the weak inductive potential of gender see also, Birnbaum et al., 2010; Taylor & Gelman, 1993; and discussion by Waxman, 2012). Further to this, while gender remained the weakest basis for projecting properties at all ages, 10-11 year olds in this study did not distinguish between gender and the control categories when drawing inferences. This indicates that the control categories lost some of their inductive power with the oldest children.

Contrary to expectations, the current study did not show the same effect of educational context on children's essentialist reasoning about social categories in NI, as the preceding two studies have. Children attending segregated and integrated schools did not differ in their pattern of inference. Further to this, the current study did not find any interaction between children's own religion group membership and their religion-based inferences; thus, Protestant children's preference for projecting to a Protestant target was not replicated in this study.

One limitation of the current study is the inability to draw firm conclusions about whether 6-7 year old children found the task too demanding or not. Because we did not directly examine how demanding children found the task to be, it is impossible to tell whether the inclusion of pictorial cues in the stimuli to highlight religion and control category memberships had any effect on their responses. However, as the distinctions that children drew between the three dimensions in the current study were stronger than they were in Study 2 (which presented only verbal information about religion and control categories), it is speculated that

inclusion of pictorial cues did make religion and the control categories more salient for all children. Therefore, it seems reasonable to speculate that 6-7 year olds in the current research may have treated membership in religion and the control categories as equally useful bases for inference because both dimensions may have been novel to them.

The way in which children are reasoning about the social dimensions presented to them in these studies will be explored in a different way, using a different measure of essentialist thinking, in Chapter 7. However, before doing so, it was deemed important to examine children's inferences from religion categories in a different social and cultural context from Northern Ireland. The reason for doing so is to examine whether children's essentialist reasoning about religion categories in NI is specific to the region's social, historical and political context (Gillespie, 2010; Gough et al., 1992; Nolan, 2014), or whether children from another country might also reason about these religion categories in the same way. The focus of the next chapter is on exploring which of these two possibilities is the most likely.

Chapter 6: Study 4

6.1. Introduction

Thus far, the research detailed in this thesis has focused on obtaining evidence of essentialist reasoning about ethno-religion categories across childhood in Northern Ireland (NI). This has taken the form of three inference studies, used as an index of children's essentialist beliefs about how informative and distinct different social groups are in comparison to one another. These studies have suggested that from 8 years of age, children in NI essentialise the ethno-religion categories *Catholic* and *Protestant* more strongly than other available categories (i.e., gender and control categories), and this is influenced by the *de facto* segregated educational context.

This is similar to findings from a case study in Israel, which has shown that ethnicity is the most essentialised social dimension in childhood, and this is unique to Israel's socio-political and historical context of inter-ethnic bias and conflict (Birnbaum et al., 2010; Diesendruck, Birnbaum et al., 2013; Diesendruck, Goldfein-Elbaz et al., 2013; Diesendruck & Menahem, 2015; Segall et al., 2015). It appears that the application of children's essentialist bias to social categories is constrained by the cultural input children receive about which categorical distinctions between people are the most important to draw (see also, Astuti et al., 2004; Kinzler & Dautel, 2012; Pauker et al., 2016; Rhodes & Gelman, 2009). Therefore, it has been assumed thus far that NI children's strong essentialist reasoning about religion categories is unique to the region's history of sectarian conflict between Catholics and Protestants (Gillespie, 2010; Gough et al., 1992). The importance that continues to be attached to these ethno-religion categories is evident in the segregation of the education system, housing, public space, marriage, and

cultural events and activities (Nolan, 2014), and has been found to impinge on NI children's awareness from as young as 3 years of age (Connolly, 2009; 2011; Connolly et al., 2009; Connolly et al., 2002).

However, the possibility that children from other cultural contexts might also strongly essentialise religion categories cannot be ruled out. It may be that the inductive power of religion categories for children in NI does not derive from the intergroup-bias and historical conflict between Catholics and Protestants. To explore this possibility, the current study examined the religion-based inferences of children raised outside NI – children from Boston, USA.

6.1.1. The cultural context of the current study

The current study is a preliminary exploration of children's essentialist reasoning about religion, gender and control categories in the city of Boston in the United States. This exploratory research examined children's inferences, based on these categories, using the unconstrained inference task detailed in the preceding two chapters. This replication of the task was conducted in Boston because this city does not share the same history with NI of violent ethno-religious political conflict between Catholics and Protestants, but it is similar to Northern Ireland in other ways that make it a good basis for comparison.

Boston is one of the oldest cities in America, founded by Protestant Puritans during Colonial times in the 17th century (Quinlin, 2013), but over the centuries it became home to a large number of Irish, Scottish and English

immigrants (these groups made up approximately half the population by the end of the 19th century, see Bushee, 1899), with the Irish becoming the largest migrant group in the city due to mass migration during and after the famine in Ireland from 1846 to 1860. Because of this, the city of Boston has strong Irish heritage to this day, and Catholicism is the largest religion in the city, with one third of the population identifying as Catholic (Boston's People and Economy, 2013). While historical records report that anti-Irish prejudice was once prevalent among the native Bostonians during the 18th and 19th centuries (see O'Connor, 1995), the city now celebrates its Irish sporting and cultural heritage (see Quinlin, 2013).

While Boston and Northern Ireland share obvious historical and cultural links, Boston does not share Northern Ireland's history of ethno-religious conflict over the constitutional status of NI (i.e., Gillespie, 2010; O'Connor, 1995; Nolan, 2014). Thus, it seems reasonable to expect that the categories *Catholic* and *Protestant* would not have the same social significance and salience in Boston that they do in NI. This assumption seems even more likely due to research suggesting that Christian religion categories in the US do not hold the religious significance that they once had for many American people (see PEW Research Centre, 2015). Across America, religious affiliation has declined, with the number of people identifying as having no religion rising. In addition to this, while lessons about religion can be taught in public schools in the US, religion is not practiced as part of the ethos of public school life in America (The PEW Forum on Religion & Public Life, 2007). In contrast, most segregated schools in NI incorporate prayers and religious practice into school life, and the Catholic

and Protestant Churches in NI are heavily involved in the running of separate schools (see Smith, 2001).

There is a distinct lack of research in the US that has examined what children know about various religion categories; one study examining the age at which US children acquire knowledge of a range of words reports that US children have concepts of religion categories at around 9 years of age (see Kuperman, Stadthagen-Gonzalez & Brysbaert, 2012). Only one study has explored whether American children essentialise religion categories (i.e., Chalik et al., 2017). This study by Chalik et al. (2017) was conducted with Christian and Jewish children and adults in New York. Participants were presented with the switched-at-birth task, which measures essentialist beliefs about the innate potential of category membership and how resistant category membership is to change. The religion categories examined were Christianity, Judaism, and novel religion categories (e.g., the flurpish religion). The authors reported that 5 year old children, regardless of religion group membership, seemed to strongly essentialise familiar and novel religion categories equally; they believed that a child raised by members of a different religion group would not change religion group membership. This tendency declined across childhood and into adulthood, with differences emerging between groups at 10 years of age. Ten year olds and adults, who were religious Jews, essentialised religion categories over novel categories, and Judaism more than Christianity, compared to less religious Jewish participants and Christian participants. This study indicates that Jewish 10 year olds' and adults' religion group membership and level of indoctrination

into their own religious practices led them to essentialise religion more strongly than others.

In a US study with adults, essentialist beliefs about religion groups were examined by Toosi and Ambady (2011) in Boston, who found that essentialist beliefs about Catholicism and Protestantism were weaker in comparison to essentialist beliefs about the naturalness, cohesiveness and objectivity of Islam, Judaism and Hinduism. One explanation for this may be that Islam, Judaism and Hinduism are reasoned about as ethnic as well as religious categories, while research has found that Christian religion groups in the US are not and so are perceived as more belief-based than as natural categories (see research by Cohen and Hill, 2007). Thus, it seems reasonable to expect religion categories to be essentialised more strongly in NI, where concepts of the religion categories, *Catholic* and *Protestant*, are conflated with differences in beliefs about politics, nationality and ethnicity (see Connolly et al., 2002; Gough et al., 1992; and see Stringer & Cairns, 1983, for a study of adolescents' willingness to state that physical differences in appearance exist between Catholics and Protestants in NI).

6.1.2. The current study

Due to the different cultural context surrounding religion categories in the US, it is expected that the pattern of results found with American children will be different from the pattern of essentialist reasoning that has emerged with NI children. The current study will examine children's inferences using the unconstrained inference task detailed in Chapter 4 with half the sample,

and the unconstrained inference task detailed in Chapter 5 with the other half. The only difference between the two tasks is the inclusion of visual cues about religion and control category memberships in the stimuli for half the children, while the other half received pictorial cues only for gender category membership. This was carried out to examine potential differences between US children, which may exist due to differences between the two sets of stimuli, in the salience of the social categories presented. Like the preceding two studies, the current research invited US children to project a novel property from a base character to a target character, based on the category memberships that the two characters did or did not share.

Due to the declining numbers of American adults who identify as practising Christians (The PEW Forum on Religion & Public Life, 2007), and the weaker essentialist reasoning that has been found in relation to Christian categories, compared to other religions in the US (i.e., Chalik et al., 2017; Toosi & Ambady, 2011), it is predicted that overall, older American children will not essentialise Catholicism or Protestantism any more than the control categories in the present study. It is also predicted that 6-7 year old children might essentialise religion and the control categories the most, as found by Chalik et al. (2017) when they invited children to reason about familiar and novel religion categories. Further to this, it is expected that 10-12 year olds might distinguish between religion and the control categories, similar to the pattern found by Chalik et al. (2017), who found that older US children distinguished between familiar and novel religion categories in their essentialist reasoning.

6.2. Method

6.2.1. Participants

The participants were 67 children, aged 5 to 12 years, recruited from public schools in Boston, USA. See Table 6 for a further breakdown of the sample. The ethnic and racial diversity of children in Boston public schools is 90% European American, 2% African American, 5% Asian American and 3% Latino (see Pew Research Centre, 2014). Written parental consent was provided for every child who participated, as well as verbal assent by each child.

Table 6. Further information about the sample in Study 4.

School Type	Age Group	Religion	Percentage of Students Receiving Free or Subsidized Meals
Public	5-7 years old: N=30 8-9 years old: N=16 10-12 years old: N=21	Catholic: 29% Protestant: 12% Other/Mixed: 5% Not Religious: 54%	27%

6.2.2. Design and Materials

The design of the task used in the current study, conducted with a sample of children from the US, was exactly the same as in the previous two

studies in Chapters 4 and 5. Children were presented with 12 trials, consisting of 3 sets of computer-drawn, coloured pictures, accompanied by verbal labels highlighting the categories being presented in the pictures. In this study all children participated in the same inference task, but 35 children received stimuli presenting pictorial cues about category membership like the children in Study 3, and 32 children received pictorial cues only about gender category membership like the children in Study 2. The aim of this was to examine whether the different stimuli sets might affect children's patterns of inference, so that the findings from this study could be compared to the same studies conducted in NI.

As in the previous two studies, each set of pictures in this study presented information about two categories: Set 1 conveyed religion group membership and gender group membership, Set 2 conveyed religion group membership and membership of the control categories, and Set 3 conveyed gender group membership and membership of the control categories. The order of set presentation was counterbalanced across participants. Children were asked to project a property from a base picture to each of four target pictures in each set, and the category memberships shared by each base and target were manipulated across trials.

The materials used in this study were the same materials used in Study 2 and Study 3. The stimuli set presenting pictorial cues for each dimension conveyed religion group membership by two different drawings of a church to symbolise the two religion dimensions – *Catholic* and *Protestant*. The control categories were conveyed by drawings of a *hamster* or a *goldfish* in the pictures to indicate which pet the character in the picture owned.

Gender group membership was clearly drawn as either a *boy* or a *girl*, or the character was presented as an androgynous silhouette in Set 2 when gender group membership was not one of the dimensions presented in these trials. The same three novel properties used in the previous two studies were used in this experiment. As before, properties were counterbalanced across each set of trials.

6.3.3. Procedure

The data in the current study was collected by a collaborator from Northeastern University in Boston who directed his research assistants to carry out the experiment in Boston public schools so that it could be included in this thesis. The aim of the collaboration was to compare children's essentialist reasoning about religion categories in Boston to children's essentialist reasoning about religion categories in Northern Ireland.

Just like children who were tested in Northern Ireland, children in Boston participated individually in the experiment in a quiet corner of the classroom after giving their verbal assent to take part. The procedure used in Boston was the same as the procedure used in Northern Ireland. The experimenter explained to children that they would be taking part in a picture task to see how they think about other children and that there were no right or wrong answers to the questions. The script used can be seen in Figures 11 and 12, and is identical to the script used in Study 2 and Study 3. In each trial, children were presented with a base picture and a target picture, and they told which category memberships the target did or did not share with the

base. Children were then invited to project a novel property from the base to each of the four target pictures in each set. Children were given a score of 1 for each trial in which they made an inference on and a score of 0 for every trial in which they chose not to draw an inference on.

6.3. Results

6.3.1. Scoring

There were 12 trials and children could score a maximum of 4 for each dimension when collapsing across the trials, just like the previous two studies. Children were given a score out of four for each dimension because they had four opportunities to draw an inference based on each dimension.

6.3.2. Preliminary analysis of stimuli version

Before moving on to the main findings, the effect of each stimuli version on children's inferences was examined. Approximately half the children in the sample (N=35) received the stimuli that included pictorial cues for all three dimensions included in the study, while half the children (N=32) received the reduced version of the stimuli that only included pictorial cues about gender group membership (religion categories and the control categories were not pictorially represented). A 2 (stimuli set: full pictorial version and reduced pictorial version) x 3 (dimension: religion categories, gender categories, control categories) mixed analysis of variance was carried out. The results showed that there was a significant main effect of

dimension, $F(2, 130)=11.33$, $p<0.001$, $\eta^2_{partial}=0.15$, but no significant interaction between the stimuli version presented and children's inferences based on each dimension, $F(2, 130)=1.26$, $p=0.13$, $\eta^2_{partial}=0.03$. There was also no significant main effect of stimuli version on children's general rate of inference (collapsed across dimension), $F(1, 65)=0.08$, $p=0.78$, $\eta^2_{partial}=0.001$. As the difference between the two sets of stimuli did not have an effect on children's pattern of inference, the subsequent analyses were conducted on the data as a whole, collapsing across stimuli sets.

6.3.3. Main findings

Children's scores out of 4, collapsed across trial type, for each dimension, were analysed. A 3 (age group: 5-7yrs, 8-9yrs, 10-12yrs) x 3 (dimension: religion, gender, control) mixed ANOVA was conducted. A significant main effect of dimension was found, $F(2, 128)=9.53$, $p<0.001$, $\eta^2_{partial}=0.13$. There was no significant interaction between age and dimension, $F(4, 128)=0.72$, $p=0.58$, $\eta^2_{partial}=0.02$. Post hoc paired t tests (Bonferroni corrected, $p=0.0167$) showed that children made more inferences based on religion group membership ($M=2.63$, $SD=1.2$), $t(66)=4.87$, $p<0.001$, Cohen's $d=0.55$, and membership of the control categories ($M=2.51$, $SD=1.13$), $t(66)=3.74$, $p<0.001$, Cohen's $d=0.45$, than they did based on gender category membership ($M=2.01$, $SD=1.07$), and they did not distinguish between religion group membership and membership of the control categories, $t(66)=0.8$, $p=0.43$, Cohen's $d=0.1$. One sample t tests revealed that children's rate of inference based on religion group membership, $t(66)=4.26$, $p<0.001$, Cohen's $d=1.05$, and membership of the

control categories, $t(66)=3.67$, $p<0.001$, Cohen's $d=0.9$, were significantly above chance level. Their rate of inference based on gender group membership, $t(66)=0.12$, $p=0.91$, Cohen's $d=0.03$, did not significantly differ from chance level.

6.3.4. Comparisons to chance within each age group.

Comparisons to chance were carried out within each age group, and can be seen in Figure 14. It was found that at 5-7 years of age, children's inferences based on religion group membership ($M=2.83$, $SD=1.09$), $t(29)=4.21$, $p<0.001$, Cohen's $d=1.05$, and membership of the control categories ($M=2.8$, $SD=1.06$), $t(29)=4.12$, $p<0.001$, Cohen's $d=1.53$, were at a rate significantly greater than chance level, while their inferences based on gender group membership ($M=2.1$, $SD=1.03$), $t(29)=0.53$, $p=0.6$, Cohen's $d=0.2$, did not significantly differ from chance level.

At 8-9 years of age, children's rate of inference based on membership of the control categories ($M=2.63$, $SD=1.15$), $t(15)=2.18$, $p=0.05$, Cohen's $d=1.36$, was significantly above chance level, but their rate of inference based on religion group membership ($M=2.5$, $SD=1.21$), $t(15)=1.65$, $p=0.12$, Cohen's $d=0.85$, and gender group membership ($M=2.19$, $SD=1.11$), $t(15)=0.68$, $p=0.51$, Cohen's $d=0.35$, did not significantly differ from chance level.

At 10-12 years of age, children's rate of inference based on religion group membership ($M=2.43$, $SD=1.36$), $t(20)=1.44$, $p=0.17$, Cohen's $d=0.64$, membership of the control categories ($M=2$, $SD=1.1$), $t(20)=0$, $p=1$, Cohen's

d=0, and gender group membership (*M*=1.76, *SD*=1.09), *t*(20)=1, *p*=0.33, Cohen's *d*=0.45, did not significantly differ from chance level.

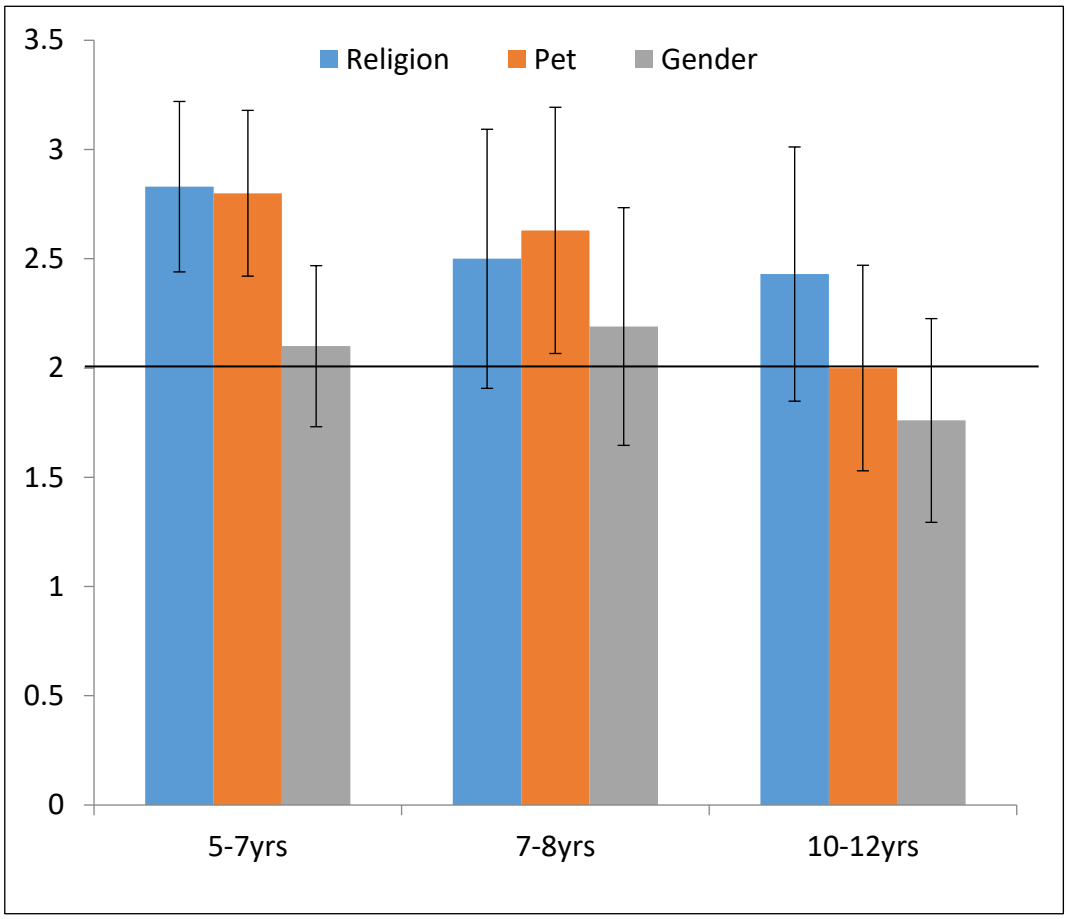


Figure 14. Mean inferences (out of 4) based on each dimension (chance=2), within each age group, in Study 4.

6.4. Discussion

The present study was a replication of the unconstrained inference task used in Study 2 and Study 3 of this thesis, conducted with children living in Boston, USA. Like the previous two studies detailed in this thesis, the current study showed no differences between US children depending on whether they received stimuli with full pictorial cues or not. With regards to the

hypotheses, it was predicted that children in the US would not appear to essentialise religion categories as strongly as children in NI, and that younger children would be more likely than older children to show a preference for religion and the control categories when drawing inferences. This is based on the findings of Chalik et al. (2017) who reported that 5 year olds in the US showed essentialist reasoning equally about familiar (Judaism and Christianity) and novel religion categories. Moreover, it was predicted that like Chalik et al. (2017), the current study would find that older children, around 10 years of age, would distinguish between religion and the control categories when drawing inferences.

The results of the current study mostly supported these expectations. It was found that American children displayed an overall pattern of reasoning that was similar to NI children in Study 2; US children preferred to draw inferences equally on the basis of shared religion and control category memberships, while gender was inductively weak. However, when each age group was examined individually, a different pattern of reasoning from NI appeared to emerge. From 8-12 years of age – the age at which essentialist reasoning in NI appears to emerge – US children did not show a preference for religion categories over the control categories. In fact, at 8-9 years of age, US children showed a greater preference for the control dimension than they did for religion.

Further to this, like Chalik et al. (2017) found, 5-7 year old children in the current study privileged religion and control categories equally in their pattern of essentialist reasoning at this age. This is similar to the pattern of reasoning shown by 6-7 year olds in NI in the first three studies of this thesis.

The youngest children in NI and the US were willing to project properties based on shared memberships in the dimensions presented to them, so long as that dimension was not gender.

In contrast to the findings from NI and Chalik et al. (2017), 10 year old children in the current study did not privilege religion categories over novel/control categories when drawing inferences. The oldest children in the current study treated religion and control categories (as well as gender) as equivalent in their inductive potential, and they also treated membership in these categories as less informative than 6-7 year old children did. This finding suggests that children from Boston did not essentialise the religion categories, *Catholic* and *Protestant*, and this is supported by research indicating that Christianity has declined across the USA in recent decades (PEW Research Centre, 2015). This finding is also supported by research showing that children (Chalik et al., 2017) and adults (Toosi & Ambady, 2011) hold weaker essentialist beliefs about Christian religion groups than they do about religions such as Judaism, Islam and Hinduism.

Regarding children's high and equal preference for religion and control categories at 6-7 years of age on both sides of the Atlantic, it is suspected that children at this age might find these categories inductively powerful because they are novel to them. Because an essentialist bias emerges early in childhood, from at least 4 years of age (see Gelman, 2003), it is likely that children are willing to apply it to a range of social categories that are presented to them, until cultural input across development directs children to essentialise some categories more than others. If this is the case, then 6-7 year olds may have been willing to essentialise religion and pet ownership

categories because they were unfamiliar. By 8 years of age, children's concepts of these categories are likely to be more developed. As a result, 8-11 year old children from NI are likely to have essentialised religion categories most strongly in the preceding studies, because cultural input highlights this dimension as socially significant in the Northern Irish context (while owning a goldfish or hamster is not such a meaningful distinction to draw between people) (Connolly et al., 2002; Gough et al., 1992; Nolan, 2014). Meanwhile, children from Boston, by 8 years of age, are likely to have developed concepts of religion categories, but the labels *Catholic* and *Protestant* are unlikely to carry the social significance for these children that they do in NI (see O'Connor, 1995; Quinlin, 2013 for socio-political and historical context of Boston). Thus, at 8 years of age children in Boston preferred to make inferences based on the control categories rather than on religion categories, and by 10-12 years of age, they did not show a preference for any dimension (religion, gender and control categories), and no inferences differed from chance level.

While differences seem to emerge between NI and US children at 8 years of age in their reasoning about religion categories, children in both contexts and at all ages treated gender as inductively impotent. This shows that a reluctance to base inferences on membership in gender categories is not specific to Northern Irish participants; US children did not treat gender as a useful basis for novel inference either. As discussed in Chapter 3, other inference studies have also found that children do not treat gender as particularly informative in comparison to other social dimensions (e.g., Birnbaum et al., 2010; Taylor & Gelman, 1993). This pattern may be artefact

of the inference tasks that have been used, or as Waxman (2012) pointed out, children may be overly familiar with gender categories, which may cause gender to lose inductive potential. Other measures of essentialist reasoning need to be employed to construct a fuller picture of children's reasoning about gender categories, as well as religion and control categories. Particularly because essentialism is not a unitary construct, more than one index of essentialism needs to be examined. Previous research has demonstrated that at least two main components seem to underlie essentialist reasoning; the extent to which categories are treated as naturally occurring with an objective reality and the extent to which they are seen as cohesive, unitary or entitiative (see Demoulin et al., 2006; Haslam et al., 2000). The next chapter in this thesis will examine NI children's essentialist reasoning about religion, gender and control categories further, using a different index of essentialist thinking.

To summarise, the results of the current study suggest that the emergence of strong essentialist beliefs about religion categories from 8 years of age in Northern Ireland is specific to the unique socio-political and historical context of this region. Meanwhile, children in Boston increasingly treat religion category membership as no more informative than gender or control category membership across childhood. Thus, any social significance that Christian religion group membership may have for children in Boston is not as strong as it is for children in NI. Further to this, the current study provided insight into NI children's reasoning about membership in religion and control categories at 6-7 years of age. Boston children at this age showed the same pattern of reasoning, treating both dimensions as equally

informative, suggesting that the youngest children in both cultural contexts may have perceived membership of religion and the control categories as relatively novel, unfamiliar categorisations. This is supported by the differences that emerged at 8 years of age in both contexts with NI children treating religion group membership as the most significant distinction to draw, while Bostonian children treated religion group membership as having less significance than they did at 5-7 years of age. Gender group membership was treated as inductively impotent in both cultural contexts, which may be because children do not see gender as particularly informative or it may be an artefact of inductive inference tasks. The following chapter will examine these possible explanations for children's use of religion, gender and control categories in NI using a different measure of essentialist reasoning.

Chapter 7: Study 5

7.1. Introduction

The studies detailed in this thesis so far have examined children's essentialist reasoning about religion, gender and control categories using children's category based inferences as an index of their beliefs. The picture that has emerged from the preceding studies (three conducted in Northern Ireland (NI) and one conducted in the US) suggest that essentialist reasoning about religion categories emerges at 8 years of age in NI, primarily within the segregated school context. Meanwhile, children from Boston do not show strong essentialist reasoning about religion categories across development, suggesting that the findings from NI are likely due to the greater emphasis that is placed on religion group membership in this region (i.e., Gillespie, 2010; Nolan, 2014; Pew Research Centre, 2015; Quinlin, 2013).

The developmental pattern of ethno-religion essentialism in NI is different from the pattern revealed by the case study of the development of ethnic essentialism across childhood in Israel (see Birnbaum et al., 2010; Deeb et al., 2011; Diesendruck, Birnbaum, et al., 2013; Diesendruck, Goldfein-Elbaz, et al., 2013; Diesendruck & ha Levi, 2006; Diesendruck & Haber, 2009; Diesendruck & Menahem, 2015; Segall et al., 2015). While the case study in Israel and the findings in this thesis both indicate that the most strongly emphasised social categories in these cultural contexts are also the most essentialised (i.e., ethnicity and religion), they differ with this effect being found from 5 years of age in Israel, but not until 8 years of age in NI. Further to this, the influence of educational context took different forms within each cultural context. In Studies 1 and 2 NI children attending *de facto* segregated schools appeared to essentialise ethno-religion categories more

than other categories from 8 years of age, while integrated children preferred not to draw distinctions between social dimensions. Meanwhile in Israel, Jewish children attending integrated schools held weaker essentialist beliefs about ethnicity at an earlier age compared to children attending *de facto* segregated schools (Deeb et al., 2011).

These differences between the case study in Israel and the case study in Northern Ireland thus far, suggest that social essentialism does not develop in the same way across different cultural and educational contexts, as other studies have also found (i.e., see Astuti et al., 2004; Kinzler & Dautel, 2012; Pauker et al., 2016; Rhodes & Gelman, 2009). While it is assumed that the differences between the case study in NI and the case study in Israel are specific to the different social categories emphasised in the particular cultural contexts they were examined in, further research is needed to rule out the possibility that the different findings may be due to methodological differences between the two case studies.

Methodological differences between the forced choice inference study detailed in Chapter 3 of this thesis, and the forced choice inference studies conducted in Israel (i.e., Birnbaum et al., 2010; Diesendruck & ha Levi, 2006) are that in NI different properties were used and the way that category membership was presented was also different. In Northern Ireland, novel properties were presented as an attribute, such as '*this child is gleeve'* or *'sproice',* rather than as a novel activity or game, such as '*plays zigo'*. For this reason, the difference in the pattern of inference between NI and Israel may be because children in NI did not find the novel attributes projectable. However, this seems highly unlikely, as 6-7 year old children in NI, as well as

the US, displayed a high rate of inference based on both religion and the control category membership using these properties.

In addition to the difference in properties used, category membership was explicitly labelled for children in Israel, for example *'is a Jewish Boy'*, while children in NI were given behavioural descriptions about religion and control category membership, such as '*this child goes to a Catholic church'* or '*this child owns a hamster'* (only gender categories were explicitly labelled). For this reason, 6-7 year olds in NI and the US may have found the task more demanding than older children because they had to infer category membership from the behavioural descriptions. This could account for 6-7 year olds' lack of differentiation between religion and the control categories in their rate of inference (but does not explain the inductive impotency of gender, which was explicitly labelled).

However, this alternative account for the developmental pattern observed thus far seems unlikely, given similar findings reported by Chalik et al. (2017) who also discovered that at around 5 years of age, US children were highly willing to endorse essentialist beliefs about familiar religion groups (i.e., Judaism and Christianity) and novel religion groups (i.e., the flurpish religion) at an equal rate. The fact that it was later in childhood when children began to distinguish between familiar and novel categories in the research by Chalik et al. (2017) (and in the present research in NI and the US), suggests that perhaps younger children view both religion categories and novel/control categories as highly unfamiliar dimensions at around 6 years of age, which may be why they did not differentiate between them. Consequently, these categories may also have been viewed as highly novel

by young children due to their unfamiliarity, which may have made religion and the control categories an attractive basis for inference, but not a socially meaningful one.

With regards to the usefulness of gender as a basis for inference in this thesis research, children within every age group in NI and the US agreed that gender was not a good basis for inference. Moreover, children in Israel have also been found to treat gender as inductively weak (Birnbaum et al., 2010; Diesendruck & ha Levi, 2006). This might seem surprising because gender is a strongly emphasised dimension to young children (see, Halim & Ruble, 2010), however, it may be that young children are overly familiar with the gender dichotomy and have so much experience with this dimension that it does not hold as much inductive power for them as other social categories.

Further to this, it is possible that children may essentialise gender more strongly as a natural category than they do along entitative lines. Research, such as that of Haslam et al. (2000), has demonstrated that essentialist reasoning is underscored by two main constructs; how naturally occurring a category is perceived to be, and how cohesive or entitative it seems. Haslam et al. found that some social categories are viewed as more natural, while others are seen as more cohesive and unified. Thus, it is possible that children in the current research might view gender as more natural than cohesive. This was found by Taylor (1996) and Taylor et al. (2009), who conducted switched-at-birth studies and reported that children held strong essentialist beliefs about the heritability and innate potential of gender traits. Meanwhile, Taylor and Gelman (1993) found that children treat

age as a stronger basis for inference, and thus a more cohesive dimension, than gender group membership.

In order to be able to draw stronger conclusions about NI children's essentialist reasoning about religion, gender, and the control studies in the preceding chapters, it is necessary to conduct further research using a different measure of essentialist thinking. The aim of the current study is to further examine NI children's essentialist reasoning about these categories using a different methodological approach. This will provide greater insight into the findings detailed in the preceding experimental chapters by revealing whether they are specific to inference tasks alone, or whether children in NI show indications of essentialist reasoning about ethno-religion categories in other ways. It is possible that NI children might view ethno-religion categories as particularly cohesive groups, and therefore inductively potent, but not necessarily as a natural, objective, stable and heritable social dimension. Moreover, the current study should also provide further insight into how exactly NI children are reasoning about gender and the control categories.

7.1.1. The current study

The current study takes a questionnaire approach to the examination of essentialist beliefs about social categories, based on the Essentialism Components Questionnaire (ECQ) developed by Diesendruck and colleagues in their research with children in Israel (see, Deeb et al., 2011; Diesendruck & Haber, 2009). Diesendruck and colleagues asked children

questions about social categories designed to probe their essentialist thinking about the distinctiveness of various categories and the discreteness of category boundaries, about how stable and immutable they viewed membership in various categories to be, and about the perceived innate potential and heritability of various category memberships. Diesendruck and Haber (2009) found the emergence of two main factors underlying essentialist thinking; *'distinctive properties'* and *'stable membership'.* They reported that children held essentialist beliefs along these two dimensions about ethnicity, gender, race and socio-economic status (SES). Further to this, there was an effect of religious sector with orthodox Jewish children essentialising ethnicity more strongly than secular Jewish children. Following this, Deeb et al. (2011) examined the reasoning of children within different educational contexts and reported the emergence of four factors underlying ethnic essentialism in their questionnaire study: the 'distinctiveness of *psychological* characteristics', the 'distinctiveness of *physiological* characteristics', the '*inheritance* of category membership', and the '*stability* of category membership'. Deeb and colleagues found that children's endorsement of essentialist beliefs about ethnicity declined across childhood from 5 to 11 years of age. They also found that Jewish children attending integrated schools showed less ethnic essentialism at the younger age of 7 compared to children attending *de facto* segregated schools, who did not show a similar level of reduction in ethnic essentialism until 11 years of age.

In the current research, seven questions from the ECQ were adopted to probe essentialist reasoning about ethno-religion categories, gender categories, and control categories with children in Northern Ireland. Twenty-

one questions in total were put to children; seven questions asked in relation to each of the three social dimensions. These questions pertained to the distinctiveness of categories along these dimensions, and to the stability and immutability of membership in those categories (the questions can be seen in Table 8 below). Five questions about category distinctiveness invited children to consider how different they thought two groups were (e.g., Catholics and Protestants, or goldfish owners and hamster owners) in their personal preferences, behaviour, physical appearance, biology and cognition. Two questions about the stability/immutability of category membership invited children to consider whether it was possible to change membership from one group to another (e.g., for a boy to become a girl), and whether a person could have dual membership in two groups (e.g., own both a hamster and a goldfish).

Given that questions about the distinctiveness and stability of categories are more likely to tap into beliefs about the naturalness of categories - rather than beliefs about cohesion/entitativity of categories as found in prior research conducted by Haslam et al. (2000) in their exploration of the factor structure underlying essentialist reasoning - it is expected that the current study might reveal more about the way in which children in NI essentialise categories, by moving beyond measurements of inductive potential alone, which could be viewed as a stronger marker of essentialist reasoning about category cohesion/entitativity. This is because induction tasks invite people to reason about how similar two category exemplars are (Murphy, 2002) – which is a characteristic of enititativity (Campbell, 1954; Hamilton, 2007; Hamilton et al., 2004; Haslam et al., 2000) – while questions

about category distinctiveness (asking people to reason about differences between groups) and discreteness of category boundaries have been found to index a more naturalised perception of categories (Dar-Nimrod & Heine, 2011; Demoulin et al., 2006; Gil-White, 2001; Haslam et al., 2000; Haslam & Ernst, 2002; Haslam & Levy, 2006; Taylor et al., 2009)

Based on the pattern of reasoning found in the previous inference studies detailed in this thesis, it is predicted that NI children in the current research will show strong essentialist reasoning about ethno-religion categories from 8 years of age. Moreover, it is predicted that this developmental pattern will interact with school type such that children attending an integrated school will show less evidence of essentialist beliefs about ethno-religious categories. It is also expected that children may show more essentialist reasoning about gender in the current study than they did in the prior inference studies, given that other research has found that children strongly endorse essentialist beliefs about the naturalness of gender categories (e.g., Taylor, 1996; Taylor et al., 2009).

7.2. Method

7.2.1. Participants

Participants were 94 children recruited from Catholic maintained and integrated primary schools in Northern Ireland, aged 6-11 years. There were 47 children in the sample from each school sector. Written parental consent was given for every child who participated, as well as verbal assent from

each child. Further information about the participants can be seen in Table 7 below. Ethical approval for this study can be found in Appendix 4.

Table *7.* Demographic information about the sample in Study 5.

School Type	Age Group	Religion
Catholic	6-7 years old: N=16 8-9 years old: N=15 10-11 years old: N=16	Catholic: 92% Protestant: 0% Other/Mixed: 2% Not Religious: 6%
Integrated	6-7 years old: N=16 8-9 years old: N=15 10-11 years old: N=16	Catholic: 45% Protestant: 34% Other/Mixed: 8% Not Religious: 13%

7.2.2. Design and Materials

This study consisted of an essentialism questionnaire based on the Essentialism Components Questionnaire (ECQ), which has been used by Diesendruck and colleagues (Deeb et al., 2011; Diesendruck & Haber, 2009; Segall et al., 2015) in previous studies with young children. Particular items from the ECQ were adapted to measure children's beliefs about the distinctiveness and stability of categories. Measuring these beliefs about

religion categories, gender categories and the control categories is an alternative method of assessing children's essentialist beliefs about these categories in comparison to studies of their inductive potential, which focuses on the perceived cohesiveness of categories.

There were six versions of the questionnaire. Each questionnaire consisted of 21 questions, presented to children verbally. Seven questions were asked pertaining to each dimension – religion, gender and control categories – and the questions were blocked by dimension. Accompanying the questionnaire were hand-drawn pictures of child characters that were used to provide children with a visible reference point during the testing session. Other than gender cues, the pictures contained no pictorial cues about category memberships. Children were told verbally what categories the characters belonged to: Catholic or Protestant, boy or girl, and hamster or goldfish owners.

For each dimension, the same block of seven questions were asked. The first five questions asked children to consider the distinctiveness of each dimension, with each question focusing on a different property. Using religion as an example (see Table 8), the first item asked children to consider how different Catholic and Protestant children are in their personal preferences, the second question asked how different these groups are in their behaviour, the third question asked how different these groups are in physical appearance, the fourth question asked how different these group are in what they have inside their bodies, and the fifth question asked how different Catholic children and Protestant children are in what they think. The exact same questions were asked about gender (boys and girls), and the

control categories (children who own hamsters and children who own goldfish). Questions 6 and 7 asked children to consider how stable membership is in the categories presented to them. Using gender as an example, the sixth question asked how possible it is for a girl to become a boy, and the seventh question asked children to consider how possible it is for a child to be a boy and a girl.

There were six versions of the questionnaire so that the order in which each block of questions was presented could be counterbalanced. As well as counterbalancing the distribution of the six questionnaire versions among participants, the order in which each category was mentioned in each question was also counterbalanced, so that children did not always hear the same category label first in each question. For example, if children were asked “how much are Catholic children and Protestant children different in what they like?”, then the following question would be “how much are Protestant children and Catholic children different in how they behave?” – so children were not presented with the same religion category first in every question.

For each question asked, children were presented with a visual rating scale on which to give their answers. This scale, which can be seen in Figure 15, shows four stick characters, each sitting at a table. Before beginning with the experimental questions, the experimenter introduced children to the rating scale by explaining what each picture in the scale was supposed to represent. Children were told that they would be asked questions about how different they think people are, or how possible they

Table 8. The questions asked about each social dimension in the ECQ used in Study 5.

	Religion	**Gender**	**Control Category**
Q.1. What they like?	How much are Catholic children and Protestant children different in what they like?	How much are boys and girls different in what they like?	How much are children who own goldfish and children who own hamsters different in what they like?
Q.2. How they behave?	How much are Protestant children and Catholic children different in how they behave?	How much are girls and boys different in how they behave?	How much are children who own hamsters and children who own goldfish different in how they behave?
Q.3. How they look?	How much are Catholic children and Protestant children different in how they look?	How much are boys and girls different in how they look?	How much are children who own goldfish and children who own hamsters different in how they look?
Q.4. What they have inside their body?	How much are Protestant children and Catholic children different in what they have inside their body?	How much are girls and boys different in what they have inside their body?	How much are children who own hamsters and children who own goldfish different in what they have inside their body?
Q.5. What they think?	How much are Catholic children and Protestant children different in what they think?	How much are boys and girls different in what they think?	How much are children who own goldfish and children who own hamsters different in what they think?
Q.6. Possibility of category change?	How possible is it for a Protestant child to become a Catholic child?	How possible is it for a girl to become a boy?	How possible is it for a child who owns a goldfish to swap it for a hamster?
Q.7. Possibility of joint membership?	How possible is it for a child to be a Catholic and a Protestant?	How possible is it for a child to be a boy and a girl?	How possible is it for a child who owns a hamster to also own a goldfish?

thought it would be for people to change from one group to another. They were told that the first stick character that had its arms down meant 'not at all', and they should pick this picture if they thought members of two different groups were not at all different, or that altering category membership was not at all possible. They were told that the second stick character with the smallest raised arms meant that they thought members of two different groups were 'a little bit' different, or that changing group membership was a little bit possible. The third stick character with wider raised arms meant that they thought members of two different groups were 'a lot' different, or that there was a lot of possibility for altering group membership. Finally, children were told that the fourth stick character with the widest raised arms meant that they thought members of two different groups were 'completely' different from each other, or that it was completely possible to change category membership.

The responses that each stick character represented were worded so that the scale would be transferrable between the questions asking about the amount of difference between categories and the questions asking about how possible it is to alter category membership. This meant that children's responses to both types of questions would be comparable.

7.2.3. Procedure/Script

Each participant was tested for 10 minutes in a quiet area of the school/classroom, with the verbal assent of each child. Before beginning

Figure 15. Example of the picture exemplars used in Study 5: There were no pictorial cues as to category membership, except for gender, as children were told the category labels of the characters.

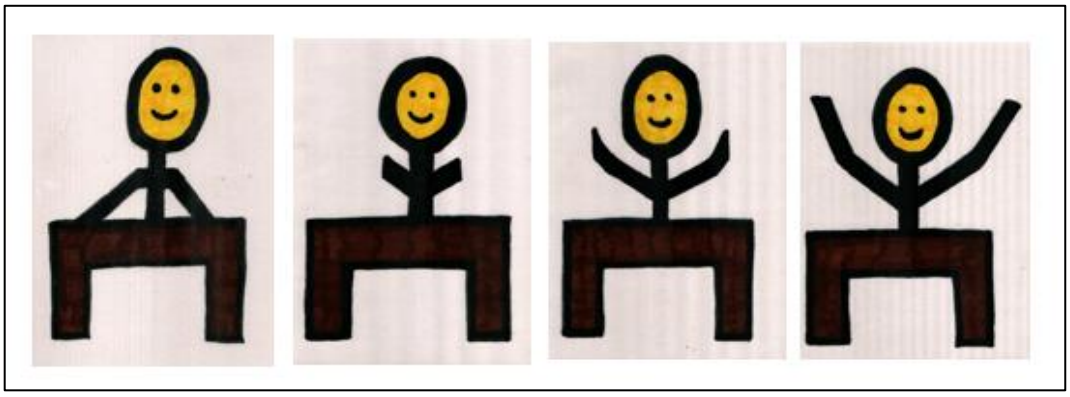


Figure 16. Materials used for the response scale in Study 5. The first picture was labelled as 'not at all', the second picture was labelled as 'a little', the third was labelled as 'a lot', and the fourth picture was labelled 'completely'.

children were told that they would be asked some questions about different people. They were told there were no right or wrong answers to the questions, and the experimenter said that they were just interested in how they think about other children. Children were assured that they could return to class at any time if they no longer wanted to take part.

Before beginning, the children were introduced to the rating scale, as seen in Figure 16, and they were told what answers each of the four pictures represented (i.e., 'not at all different/possible', 'a little bit different/possible', 'a lot different/possible', 'completely different/possible'). Children were then shown hand-drawn pictures (for an example, see Figure 15) of characters and were told that these were examples of people from the categories that the first questions would be about. Children were shown different example pictures of characters from different categories for each block of questions that they were given – so children had a different visual reference point to focus on for the religion questions, the gender questions, and the control category questions. The experimenter then went through each block of questions in the questionnaire (the order of which differed depending on which version of the questionnaire they received), which can be seen in Table 8. After asking each question, such as 'how much are boys and girls different in how they look?', the experimenter went through each option of the four point scale (pointing at each character in turn), for example, 'they are not at all different', 'they are a little bit different', 'they are a lot different', 'they are completely different'. All of the children chose a response to each question. Children's responses were recorded for scoring.

7.2.4. Scoring

Children's answers were scored from 1-4, with 1 indicating that children thought there was no difference between groups/no possibility of group membership being fluid, and 4 indicating that children thought the groups were completely different/changing group membership was completely possible (see Figure 16 for the 4 response options presented to children). Thus, higher scores on each item meant that children perceived these categories as more distinct or stable in comparison to lower scores (children's responses to the questions about the possibility of changing group membership were reverse scored so that higher scores would reflect stronger essentialist beliefs).

7.3. Results

7.3.1. Factor analyses

Three principal axis factor analyses with varimax rotation were carried out to explore underlying factors in the data from each of the three blocks of seven questions given to each participant (i.e., the block of religion questions, the block of gender questions, and the block of control category questions). As can be seen from Table 9, two distinct factors loaded onto the questions for each dimension. These factors were named distinctiveness and stability, because for each dimension, one factor loaded strongly onto the questions exploring beliefs about the distinctiveness of category boundaries, while the other factor loaded strongly onto the questions exploring beliefs about the stability of category boundaries.

The first factor analysis examining children's beliefs about religion categories, showed that factor 1 – distinctiveness – accounted for 34% of the variance and factor 2 – stability – accounted for 17% of the variance. The second factor analysis examined children's responses to the questions about the control category (pet ownership). Again, the results indicated that two main factors were underlying the data, accounting for a large amount of the variance. Factor 1 – distinctiveness – accounted for 33% of the variance and factor 2 – stability – accounted for 19% of the variance. Finally, the third factor analysis exploring children's responses to the questions about gender, again, indicated that two main factors accounted for a large amount of the variance. Factor 1 – distinctiveness – accounted for 30% of the variance and factor 2 – stability – accounted for 23% of the variance. (An initial analysis showed that a third factor accounted for an additional 15% of the variance, but given the results for the other dimensions, a two factor structure was imposed on the data).

7.3.2. Analysis of category distinctiveness and category stability

Two analyses of variance were conducted for children's ratings of each category along the dimensions of category distinctiveness and category stability. Children's mean distinctiveness and stability ratings were calculated for each category and entered into separate analyses of variance.

Table 9. Factor loadings onto the seven questions from each of the three factor analyses (one factor analysis for each social dimension) in Study 5.

Question	Religion		Gender		Control (Pet)	
	Distinctive	Stable	Distinctive	Stable	Distinctive	Stable
1. What they like	**.70**	-.33	**.72**	.03	**.70**	.09
2. How they behave	**.53**	-.42	**.49**	.12	**.68**	-.01
3. How they look	**.65**	-.01	**.77**	-.21	**.64**	-.11
4. What they have inside their body	**.66**	-.009	**.44**	.008	**.74**	.11
5. What they think	**.74**	.09	**.72**	-.03	**.62**	-.14
6. Possibility of category change	.16	**.77**	-.002	**.88**	-.15	**.82**
7. Possibility of joint membership	-.16	**.65**	.004	**.91**	.10	**.79**

7.3.2.1. Category Distinctiveness

A 3 (age: 6-7 years, 8-9 years, 10-11 years) x 2 (educational context: Catholic and Integrated) x 3 (dimension: religion, gender, control categories) mixed analysis of variance was conducted on children's ratings of categorydistinctiveness. The findings showed a main effect of dimension on

children's ratings, $F(2, 176)=17.99$, $p<0.001$, $\eta^2_{partial}=0.17$. Post hoc paired t tests (Bonferroni corrected, $p=0.017$) revealed that children treated gender category membership ($M=2.73$, $SD=0.59$) as more distinctive than religion category membership ($M=2.39$, $SD=0.68$) ($t(93)=5.03$, $p<0.001$, Cohen's $d=0.53$) or membership in the control categories ($M=2.44$, $SD=0.69$) ($t(93)=4.72$, $p<0.001$, Cohen's $d=0.45$), while they did not differentiate between religion category membership and membership in the control categories ($t(93)=0.76$, $p=0.45$, Cohen's $d=0.07$).

Results of the analysis of variance also showed a significant interaction between age group and dimension on children's ratings of distinctiveness, $F(4, 176)=4.45$, $p=0.002$, $\eta^2_{partial}=0.92$. The means involved in this interaction can be seen in Figure 17. The interaction between educational context and dimension was non-significant, $F(2, 176)=1.12$, $p=0.33$, $\eta^2_{partial}=0.013$, as was the interaction between age, educational context and dimension, $F(4, 176)=0.18$, $p=0.95$, $\eta^2_{partial}=0.004$). There also was no significant main effect of age group, $F(2, 88=1.69$, $p=0.19$, $\eta^2_{partial}=0.037$) or educational context, $F(1, 88)=0.75$, $p=0.39$, $\eta^2_{partial}=0.008$) on children's general rate of inference, nor was there was a significant two-way interaction between age group and educational context, $F(2, 88)=0.71$, $p=0.5$, $\eta^2_{partial}=0.016$). The significant interaction between age group and dimension was followed up by three 2 (school: Catholic, integrated) x 3 (dimension: gender, religion, control categories) mixed analyses of variance – one for each age group.

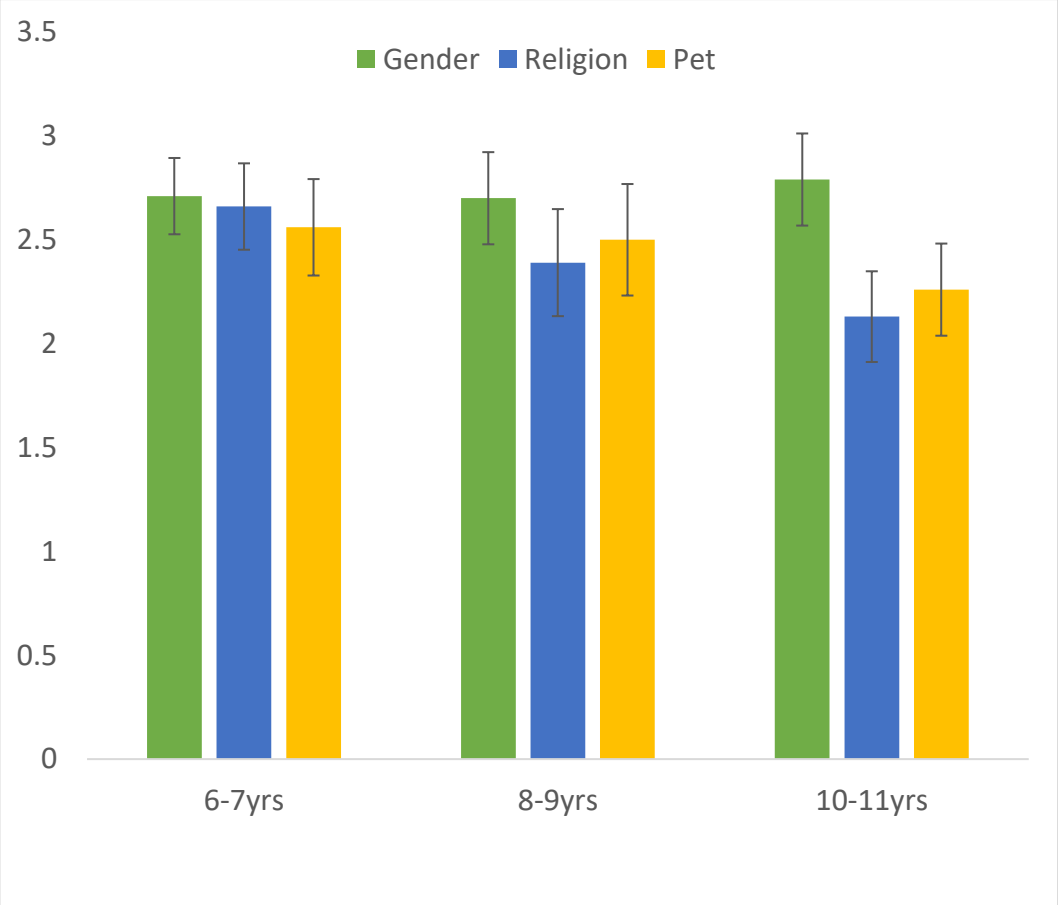


Figure 17. Children's ratings of category distinctiveness (out of 4) within each age group in Study 5.

The analysis of variance for 6-7 year olds showed that there was no significant main effect of dimension on children's ratings of distinctiveness, $F(2, 60)=0.76$, $p=0.47$, $\eta 2partial=0.03$; they treated religion categories ($M=2.66$, $SD=0.6$), gender categories ($M=2.71$, $SD=0.53$) and the control categories ($M=2.56$, $SD=0.67$) as equivalent in how distinctive membership in each of these social dimensions was perceived to be. There was also no significant interaction between educational context and social dimension at 6-7 years of age, $F(2, 60)=0.42$, $p=0.66$, $\eta^2 partial=0.014$, and there was no

significant main effect of educational context on children's general rate of inference, F(1, 30)=1.4, p=0.25, η^2partial=0.045.

This changed at 8-9 years of age, with the analysis of variance for this group showing a significant main effect of dimension, *F*(2, 56)=4.64, *p*=0.01, $\eta^2_{partial}$=0.14. Paired t tests (Bonferroni corrected, *p*=0.006) revealed that children treated gender categories (*M*=2.7, *SD*=0.62) as more distinctive than religion categories (*M*=2.39, *SD*=0.72) (*t*(29)=3.05, *p*=0.005, Cohen's *d*=0.46), but they did not distinguish between gender categories and the control categories (*M*=2.5, *SD*=0.75) (*t*(29)=1.76, *p*=0.09, Cohen's *d*=0.29), or between religion categories and the control categories in their ratings (*t*(29)=1.23, *p*=0.23, Cohen's *d*=0.15). The analysis did not reveal a significant interaction between educational context and social dimension on childrens' mean ratings of category distinctiveness, F(2, 56)=0.31, p=0.74, η^2partial=0.011, and there was no significant main effect of educational context on children's general rate of inference, F(1, 28)=0.77, p=0.39, η^2partial=0.027.

At 10-11 years of age, an analysis of variance also showed a significant main effect of dimension on children's ratings of distinctiveness, *F*(2, 60)=29.34, *p*<0.001, $\eta^2_{partial}$=0.49. Paired t tests (Bonferroni corrected, *p*=0.006) showed that children rated gender categories (*M*=2.79, *SD*=0.64) as more distinctive than religion categories (*M*=2.13, *SD*=0.63) (*t*(31)=7.23, *p*<0.001, Cohen's *d*=1.04), and they rated gender categories as more distinctive than membership in the control categories (*M*=2.26, *SD*=0.64) (*t*(31)=5.36, *p*<0.001, Cohen's *d*=0.83), They did not distinguish between religion categories and the control categories in their ratings of

distinctiveness (*t*(31)=1.53, *p*=0.14, Cohen's *d*=0.2). There was no significant interaction between educational context and social dimension in this age group, F(2, 60)=0.87, p=0.42, η^2partial=0.028, and there was also no significant main effect of educational context on children's general rate of inference, F(1, 30)=0.21, p=0.65, η^2partial=0.01.

7.3.2.2. Category stability

A 3 (age: 6-7 years, 8-9 years, 10-11 years) x 2 (educational context: Catholic maintained and Integrated) x 3 (dimension: gender, religion and control categories) mixed analysis of variance was conducted on children's ratings of category stability. This revealed a main effect of dimension on children's ratings, *F*(1.8, 158.78)=20.86, *p*<0.001, $\eta^2_{partial}$=0.19, greenhouse-geisser corrected.

Paired sample (Bonferroni adjusted, *p*=0.0167) t tests revealed that children rated gender category membership (*M*=3.17, *SD*=1.03) as higher in stability than religion category membership (*M*=2.77, *SD*=0.83) (*t*(93)=3.64, *p*<0.001, Cohen's *d*=0.43) and control category membership (*M*=2.36, *SD*=0.93) (*t*(93)=5.18, *p*<0.001, Cohen's *d*=0.83), and they rated religion category membership as more stable than membership in the control categories (*t*(93)=3.16, *p*<0.001, Cohen's *d*=0.47).

The analysis of variance also showed that there was a significant interaction between age group and dimension on children's ratings, which can be seen in Figure 18, *F*(3.61, 158.78)=7.2, *p*<0.001, $\eta^2_{partial}$=0.14, greenhouse-geisser corrected, and there was a marginally significant

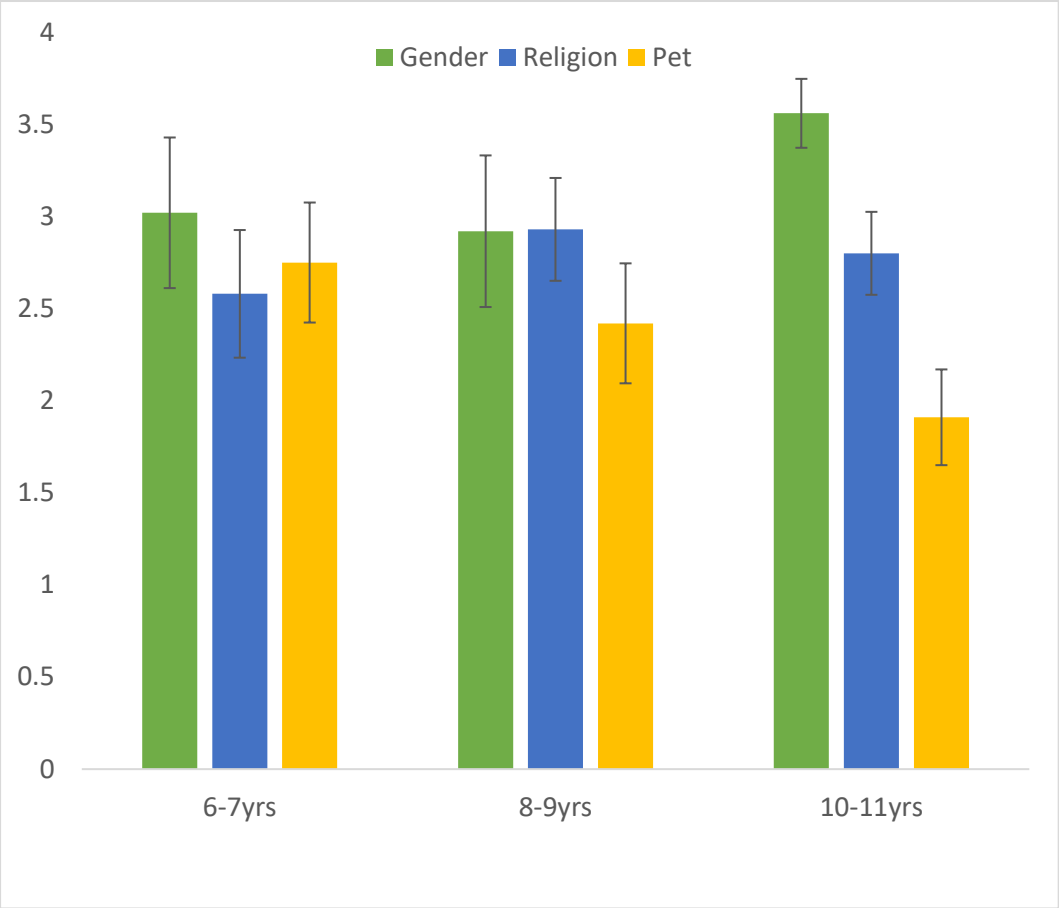


Figure 18. The interaction between age group and social dimension on children's mean ratings of category stability (out of 4) in Study 5.

interaction between school context and dimension, which can be seen in Figure 19, $F(1.8, 158.78)=2.76$, $p=0.072$, $\eta^2_{partial}=0.03$, greenhouse-geisser corrected. The three-way interaction between age group, educational context and dimension, $F(3.61, 158.78)=0.86$, $p=0.49$, $\eta^2_{partial}=0.02$, was non-significant. greenhouse-geisser corrected. There was no significant main effect of age group, $F(2, 88)=0.022$, $p=0.98$, $\eta^2_{partial}=0.001$, or educational context on children's general rate of inference, $F(1, 88)=0.003$, $p=0.96$, $\eta^2_{partial}=0.00$, nor was there a significant two-way interaction between age group and educational context, $F(2, 88)=1.14$, $p=0.33$, $\eta^2_{partial}=0.025$.

The significant interaction between age group and dimension, and the marginal interaction between school context and dimension, were followed up by three 2 (school: Catholic, integrated) x 3 (dimension: gender, religion, control category) mixed analyses of variance – one for each age group.

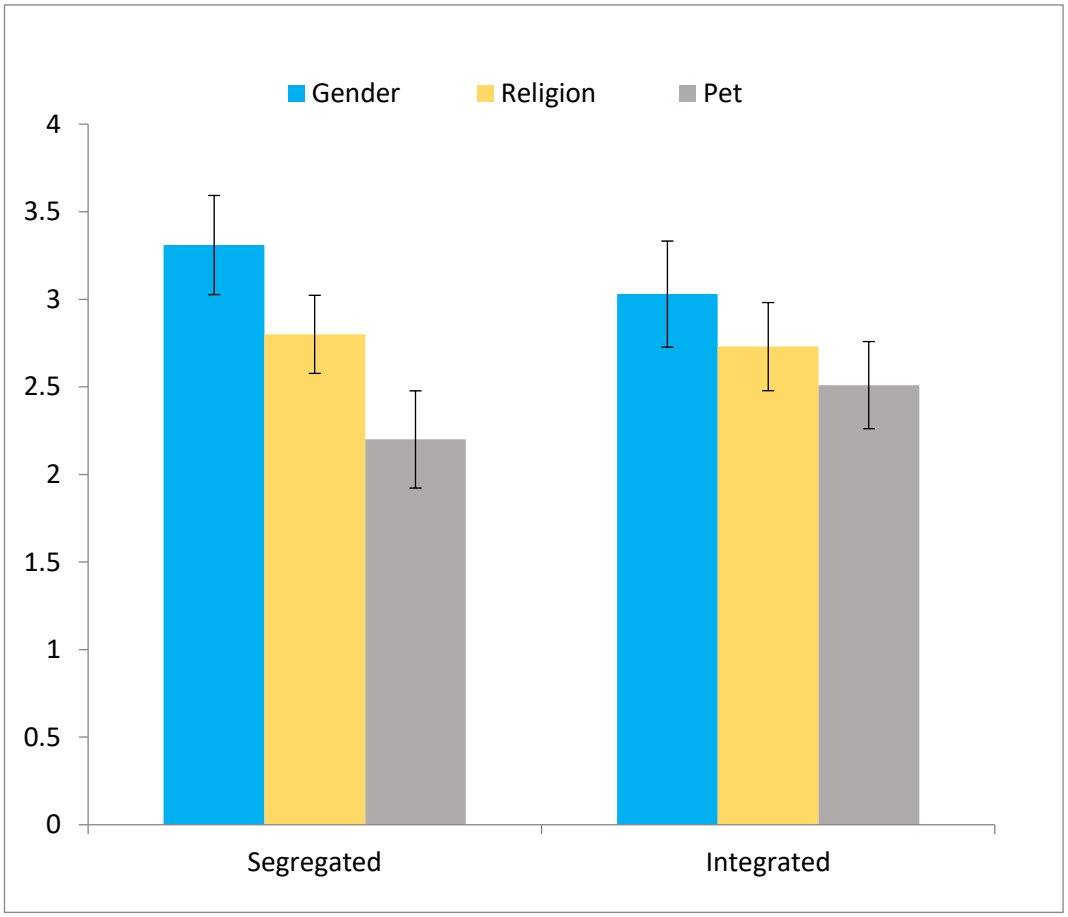


Figure 19. The marginal interaction between educational context and social dimension on children's mean ratings of category stability (out of 4) in Study 5.

For 6-7 year olds, the analysis of variance found that the main effect of dimension on children's rating of group stability was non-significant, *F*(2,

60)=1.81, p=0.17, $\eta^2_{partial}$=0.06, indicating that 6-7 year olds did not distinguish between gender categories (M=3.02, SD=1.18), religion categories (M=2.58, SD=1) and the control categories (M=2.75, SD=0.94). The interaction between school context and dimension on 6-7 year old children's ratings of stability was also non-significant, F(2, 60)=0.4, p=0.67, $\eta^2_{partial}$=0.01, indicating that children in both educational contexts did not distinguish among the categories in their ratings of stability (see means in Table 10 below). There was also no significant main effect of educational context on children's general rate of inference, F(1, 30)=0.78, p=0.38, η^2partial=0.025.

Table 10. Children's mean ratings of category stability within each age group in each educational sector in Study 5.

	Means					
	Gender	SD	Religion	SD	Control	SD
Segregated Sector						
6-7 year olds	3.25	1.1	2.63	0.9	2.81	0.87
8-9 year olds	2.9	1.18	2.83	0.84	2.23	0.94
10-11 year olds	3.75	0.37	2.94	0.57	1.56	0.68
Integrated Sector						
6-7 year olds	2.78	1.25	2.53	1.12	2.69	1.03
8-9 year olds	2.93	1.16	3.03	0.72	2.6	0.87
10-11 year olds	3.38	0.62	2.66	0.7	2.25	0.66

For 8-9 year olds, the main effect of dimension on ratings of stability was non-significant, F(1.51, 42.23)=2.5, p=0.09, $\eta^2_{partial}$=0.08, greenhouse-geisser corrected; children did not distinguish between gender categories

(*M*=2.92, *SD*=1.15), religion categories (*M*=2.93, *SD*=0.78) and the control categories (*M*=2.42, *SD*=0.91) in their ratings of stability. The interaction between school context and dimension was also non-significant, *F*(1.51, 42.23)=0.28, *p*=0.76, $\eta^2_{partial}$=0.01, greenhouse-geisser corrected (see means in Table 10). This analysis also showed no significant main effect of educational context on children's general rate of inference in this age group, F(1, 28)=1.19, p=0.29, η^2partial=0.041.

For 10-11 year olds, the analysis showed that there was a significant main effect of dimension, *F*(2, 60)=67.11, *p*<0.001, $\eta^2_{partial}$=0.69. Paired t tests (Bonferroni corrected, *p*=0.006) showed that this age group rated membership in gender categories (*M*=3.56, *SD*=0.54) as more stable than membership in religion (*M*=2.8, *SD*=0.65) (*t*(31)=6.03, *p*<0.001, Cohen's *d*=1.27) and the control categories (*M*=1.91, *SD*=0.75) (*t*(31)=10.19, *p*<0.001, Cohen's *d*=2.52), and they rated religion category membership as more stable than control category membership (*t*(31)=4.86, *p*<0.001, Cohen's *d*=1.27).

In addition to the main effect of dimension, the analysis of variance for 10-11 year olds also revealed a significant interaction between dimension and school context, *F*(2, 60)=8.45, *p*=0.001, $\eta^2_{partial}$=0.22, which can be seen in Figure 20. There was no main effect of educational context on children's general rate of inference, F(1, 30)=0.01, p=0.94, η^2partial=0.000. Post hoc t tests (Bonferroni adjusted, *p*=0.003) showed that children attending Catholic schools rated membership in gender categories as more stable than membership in religion categories, *t*(15)=4.96, *p*<0.001, Cohen's *d*=1.69, they rated gender category membership as more stable than membership in

the control categories, $t(15)=11.67$, $p<0.001$, Cohen's $d=4$, and they rated religion category membership as more stable than membership in the control categories, $t(15)=5.46$, $p<0.001$, Cohen's $d=2.2$.

Like the 10-11 year olds attending Catholic schools, their counterparts in integrated schools also rated gender category membership as more stable than religion category membership, t(15)=3.62, p=0.003, Cohen's d=1.09,

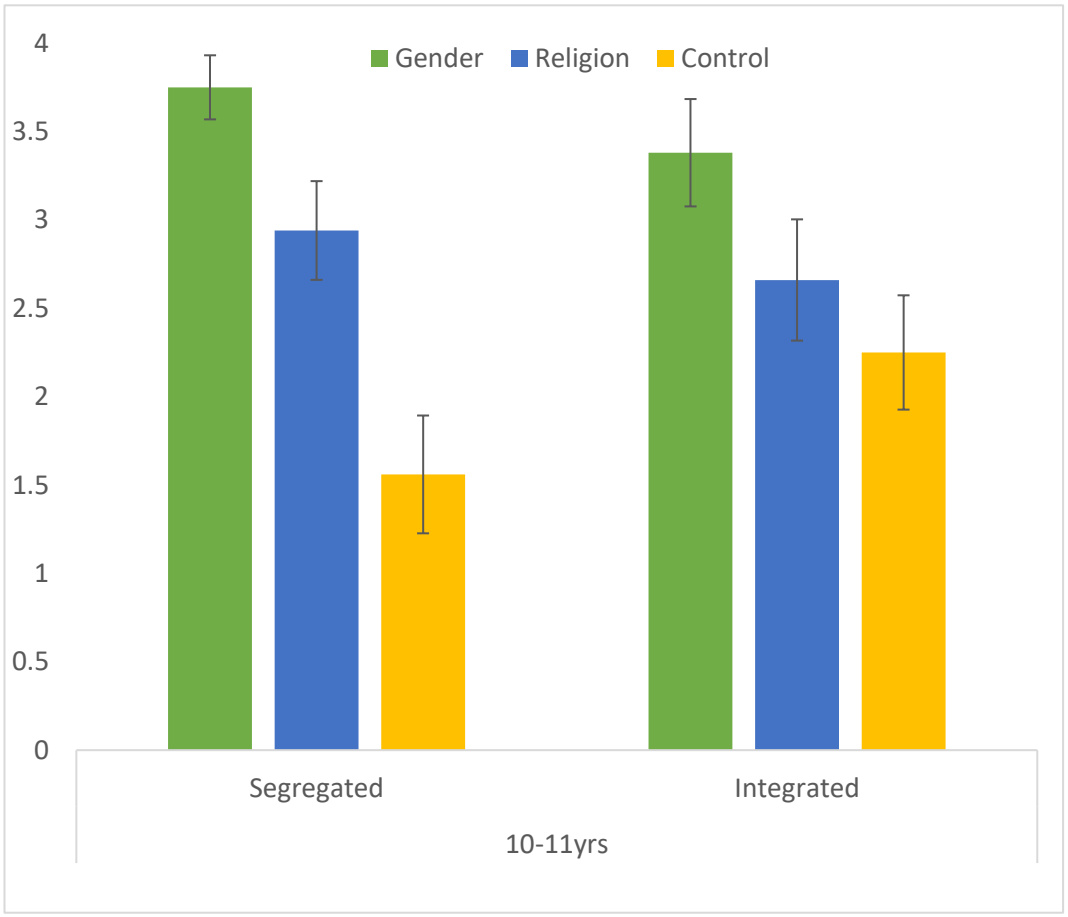


Figure 20. The interaction between educational context and social dimension on children's mean ratings of category stability at 10-11 years of age in Study 5.

and control category membership, t(15)=5.89, p<0.001, Cohen's d=1.76. However, 10-11 year olds attending integrated schools differed from this age group in the Catholic schools by not distinguishing between religion category membership and control category membership in their ratings of category stability, as can be seen in Figure x, *t*(15)=1.93, *p*=0.07*,* Cohen's *d*=0.6.

7.4. Discussion

The aim of the current study was to examine children's essentialist beliefs about religion, gender and a control category in Northern Ireland, using a questionnaire approach based on Diesendruck et al.'s Essentialism Components Questionnaire (ECQ) (Deeb et al., 2011; Diesendruck & Haber, 2009). A different approach was taken in the current chapter in order to obtain converging evidence of late emerging essentialist beliefs about religion categories among NI children. Additionally, the current study aimed to provide greater insight into the way children essentialise religion categories, as well as further exploring how exactly they are perceiving and reasoning about the control categories in this thesis research.

Based on the results of the inference studies detailed in earlier chapters, it was expected that NI children would show further evidence of essentialising ethno-religion categories, that such evidence would emerge later in childhood at around 8 years of age, and that essentialist endorsement of religion categories would be more pronounced within the segregated school context than within the integrated sector. In addition to this, owing to the nature of the questionnaire, it was predicted that children might show

more essentialist thinking about gender categories in the current study than they appeared to during the prior inference tasks. This is because earlier studies (e.g., Taylor, 1996; Taylor & Gelman, 1993) suggest that children hold strong essentialist beliefs about the naturalness of gender categories, and the ECQ may be more sensitive to essentialist beliefs about category naturalness as it invites children to reason about how distinct property differences between categories are, as well as how impermeable and stable group boundaries and membership in categories may be.

The pattern of results that emerged from the current study supported these expectations. Similar to the findings reported by Diesendruck and Haber (2009), NI children's responses to the questionnaire items formed two main factors, '*distinctiveness'* and '*stability'*. It was found that from 10 years of age, NI children held stronger essentialist beliefs about the stability of membership in ethno-religion categories (*Catholic* and *Protestant*) than they did about membership in the control categories (ownership of a goldfish or a hamster). Moreover, children's stronger essentialist beliefs about the stability of religion categories compared to the control categories emerged at 10 years of age only in the *de facto* segregated school context. In the integrated school context, children did not distinguish between religion and the control categories in their endorsement of essentialist beliefs about the stability and inflexibility of membership in these categories. This pattern of essentialist reasoning about religion categories, in comparison to the control categories, supports the previous inference findings, suggesting that essentialisation of religion categories in NI emerges late in childhood and is more likely to emerge within the context of *de facto* segregated school context. This is in

contrast to children's essentialist reasoning about ethnicity in Israel, which emerged at 5 years of age (Deeb et al., 2011; Diesendruck & Haber, 2009) and declined in strength across childhood (Deeb et al., 2011), while children attending integrated schools in Israel differed by showing an earlier decline in their endorsement of ethnic essentialism (Deeb et al., 2011). Thus, the current study reinforces the findings of the previous experimental chapters, showing that essentialisation of ethno-religion categories emerges later in NI compared to Israel – and this was found using a different measure of essentialism in the present study. Additionally, the present study also indicates that NI children are less willing to endorse essentialist beliefs about the control dimension (pet ownership) as they get older, just as they are less willing to draw inferences based on the control categories in the preceding studies. *'Pet Ownership'* appears to be treated increasingly like a control category as children get older – perhaps as their concepts of all of these categories continue to develop.

While supporting the findings of the preceding chapters, with regards to children's pattern of reasoning about religion and the control dimensions, the current study revealed a different pattern of essentialist reasoning about gender. In contrast to the prior studies, the current study showed gender emerging as the most strongly essentialised dimension, compared to religion and the control categories. That gender was essentialised more strongly than religion categories in the current study was somewhat surprising because, based on the earlier results, it was assumed that religion would be the most strongly essentialised category in NI. One explanation for this

finding may be that children in NI essentialise gender and religion categories to different degrees along different dimensions of essentialist thought.

As previously discussed in Chapter 1, researchers, such as Haslam et al. (2000), demonstrated that essentialism is not a unitary construct. They found that essentialist thinking is comprised of two dimensions – naturalness and entitativity/cohesion – and different social categories tend to be essentialised more strongly along one dimension than the other (see also, Demoulin et al., 2006; Gelman et al., 2007; Rangel & Keller, 2011; Rothbart & Taylor, 1993). Other research has also found that gender is treated as inductively impotent in comparison to other social categories (i.e., Birnbaum et al., 2010; Diesendruck & ha Levi, 2006; Taylor & Gelman, 1993), while strongly endorsing essentialist beliefs about the naturalness of gender (i.e., Diesendruck & Haber, 2009; Rhodes & Gelman, 2009; Taylor, 1996; Taylor et al., 2009) in different types of measures. Perhaps children essentialise gender more strongly along the dimension of 'naturalness' rather than along the dimension of 'cohesion/entitativity'. It is likely that the ECQ taps into beliefs about category naturalness more than the inference task.

In contrast, religion may be essentialised more strongly by NI children along the dimension of cohesion/entitativity than along the naturalness dimension. This would account for the strong inductive potential of religion for children in NI, as the inference tasks in the preceding chapters were a measure of how cohesive children viewed certain categories to be, and how informative they found membership in religion categories to be. The inference tasks might not be a good measure of how natural children perceive these social dimensions to be; the ECQ may be a better index of

category naturalness as it invites children to consider how distinctive membership in different categories is, as well as how impermeable and stable group boundaries and membership in categories may be – these are aspects of a more naturalised view of categories (Haslam et al., 2000).

One issue in interpreting the results of this study is that although religion category membership was judged more stable than membership in the control categories, it was not perceived as more distinctive than the control category. This is problematic if one interprets category distinctiveness items in the ECQ to measure cohesiveness (as do Diesendruck & Haber, 2009). However, the category distinctiveness items asked children to reason about how different they thought each category was from another, and how sharp they viewed the boundaries between different category memberships. In contrast, cohesion or entitativity refers to beliefs about how similar all members of the same category are perceived to be and how unified a category seems to be as a whole (for a discussion of entitativity, see Campbell, 1954). Thus, the distinctiveness items appear more likely to tap into beliefs about how natural categories are rather than how similar members of a particular category are to one another (as induction scenarios invite us to do, Murphy, 2002).

With regards to the control dimension of pet ownership in the current study, children did not strongly endorse essentialist beliefs about the distinctiveness or the stability of this dimension as assessed by the ECQ. Thus, children did not treat this category as a natural kind, and so the dimension of pet ownership only seems to feature strongly as a basis for inference for children at around 6 years of age. As the preceding studies in

this thesis have shown, the control category becomes a weaker basis for inference in comparison to religion categories across development in NI and the USA. This supports our view that interest in the control dimension may be due to its novelty for young children. Across development, children may have lost interest in it because their essentialist bias becomes constrained by cultural input, and the significance of ethno-religion categories in NI becomes more strongly impressed upon them. Meanwhile, the control category of pet ownership may become increasingly viewed as a socially meaningless category, as children's concepts of various categories develop with age. This is further supported by the finding that children in this questionnaire study did not distinguish between any of the three social dimensions in their endorsement of essentialist beliefs at 6 years of age – differentiation between these categories emerged from 8 years of age.

Thus, in conclusion to this chapter, it would seem that the addition of the ECQ to this thesis research was useful in confirming that essentialist beliefs about religion categories in NI are late emerging in comparison to the case study of ethnic essentialism in Israel (i.e., Birnbaum et al., 2010; Deeb et al., 2011; Segall et al., 2015). It has also reinforced the conclusion that educational context does influence the development of social essentialist reasoning in NI (at least along the aspect of category stability in the current chapter). The ECQ has also been able to reveal that children in NI do hold essentialist beliefs about gender, but perhaps along the dimension of naturalness rather than entitativity/cohesion.

New effects to emerge from this study were the findings that gender categories were essentialised as the most distinctive and stable groups.

Religion was not essentialised as strongly in this study as it was in the previous research in NI; here it was essentialised more than the control dimension as a more stable, naturally occurring and unmalleable category, but not as a more distinctive dimension than the control. However, while essentialist beliefs about religion were weaker in this study, they still supported the pattern of results from the inference tasks, indicating that religion group membership is essentialised more than control group membership from around 8 years of age, and this is more likely to be observed within the segregated educational context.

The current study also highlights the importance of taking more than one approach to examining essentialist thinking, because different categories may be essentialised along different dimensions of essentialist thought. Using more than one measure of essentialist thinking can reveal a fuller picture of how categories are being reasoned about.

In relation to the influence of educational context on children's essentialist reasoning, it should be noted that this effect has not been entirely consistent across each of these studies detailed in this thesis. Therefore, while this chapter is the final experimental chapter of this thesis, the next chapter will consist of a secondary analysis of the data from the preceding chapters before moving on to the general discussion chapter. The following chapter will describe the results of a meta-analysis of the data obtained from each school in NI that participated in this case study in an attempt to clarify the effect of educational context on children's essentialist reasoning about religion in NI.

Chapter 8: Meta-Analysis

8.1. Introduction

The results presented in this thesis support two claims. First, they suggest that essentialist beliefs about religion categories emerge relatively late in Northern Irish children. Second, they suggest that the likelihood that a child will develop essentialist beliefs about religion categories is greater if that child is attending a segregated school. However, the evidence does not appear to support each of these claims equally strongly. Thus, in this brief chapter I will describe a meta-analysis that seeks to ascertain the strength of the evidence in favour of the weaker of these claims.

The evidence about the age at which essentialist beliefs emerge is strong. For example, Study 1 indicated that essentialist beliefs about religion categories emerge at 8 years of age. Using a different experimental task, Study 2 indicated that religion essentialism emerges later at around 10 years of age for children attending Protestant controlled schools, and at 8 years of age for children attending Catholic maintained schools. Study 3 suggested that essentialist reasoning about religion emerges at 8 years of age and Study 5 suggested that religion categories in NI are essentialised more strongly than control categories by 10 years of age. Thus, an effect of age has been found in each of the studies summarised here, such that children appear to develop essentialist belief about religion categories no earlier than eight years of age.

However, the evidence in favour of the second claim,that essentialist beliefs about religion categories are more likely to appear amongst children attending segregated schools is not so consistent. Although there is evidence

of such beliefs amongst children attending segregated schools but not amongst children attending integrated schools in Studies 1, 2 and 5, both integrated and segregated school children in Study 3 displayed essentialist beliefs about religion categories. It is possible, therefore, that children attending integrated schools develop essentialist beliefs about religion categories, but our studies did not have sufficient statistical power to detect such effects. Accordingly, in this chapter we will describe a meta-analysis designed to assess the evidence for essentialist beliefs about religion categories amongst integrated and segregated school children across all of our Northern Irish studies.

A second aim of the meta-analysis was to test an alternative explanation for any findings of an association between essentialist beliefs and school type. Because schools are set in communities, it is possible that it is community diversity rather than school diversity which is the important factor in determining whether children develop essentialist beliefs about religion categories. Thus, we might find that the communities in which integrated schools are located tend to be more religiously diverse than are the communities in which segregated schools are located. More importantly, we might find that, collapsed across school type, children attending schools located in more diverse areas tend to show more evidence of essentialist beliefs about religion categories than children attending schools located in less diverse areas.

8.1.1 Meta-analysis Overview

Although it is common for meta-analyses to be carried out over discrete studies, a different approach was taken here. Instead of taking experiment, or experimental condition, as the unit of analysis, school was the basic unit in the meta-analysis to be reported here. Thus, our hypotheses concerned whether significant effects of essentialist beliefs about religion categories were seen in the segregated and integrated schools that participated in this project. Moreover, the meta-analysis allowed an examination of whether there was a statistical relationship between the religious diversity of the community in which each school was located, and the size of the essentialism effect that was observed in that school.

8.2. Method

8.2.1. Data selection

Studies 1, 2, 3, and 5 of this thesis were selected for meta-analysis (Study 4 was conducted with children in the US and so was excluded). For the data collected from each of the 20 schools in Northern Ireland (N=24 segregated schools and N=6 integrated schools), effect sizes were calculated in relation to the difference in children's essentialism scores between religion and the control dimension.

As Study 1 was a forced-choice study, children's religion essentialism score, on trials where religion was put into conflict with the control category, were used and chance (i.e., score of 2 was chance) was subtracted from it. This was done because there were no absolute essentialism scores for the

dimensions in Study 1, as children's category based inferences were all relative. For the two unconstrained inference tasks in Studies 2 and 3, children's absolute essentialism scores were available, so the overall essentialism score for the control category was subtracted from the essentialism score for the religion category. With regards to Study 5, the ECQ study, children's overall essentialism score for the control category was subtracted from their overall essentialism score for religion. When these difference scores and their associated effect sizes for each school were entered into the Comprehensive Meta-Analysis Software (Borenstein, Hedges, Higgins & Rothstein, 2009), the schools were grouped by educational sector (i.e., segregated or integrated) as school type was the unit of analysis that we were interested in.

With regards to the analysis of community diversity as a predictor of children's essentialism scores, information about the areas in which children lived was not obtained at the time of data collection. Due to this, an estimate of the level of community diversity that children were likely to be exposed to in their local community had to be made. This was carried out by examining the ethno-religion composition of the ward that each school was located within, because proximity to schools is one of the selection criteria for being admitted to a primary school in NI, so it is likely that children lived in the same area where their school was located. The number of people living in each electoral ward ranged from 1000 to 9000.

Using census data (obtained from Northern Ireland Neighbourhood Information Service, 2012) showing the percentage of people from Catholic and Protestant backgrounds in each ward area, community diversity scores

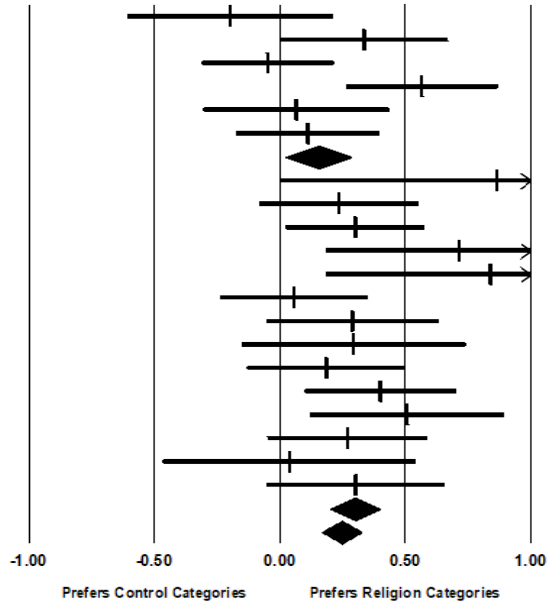
were calculated by subtracting the percentage of Protestants from the percentage of Catholics. This produced community diversity scores that could range between 0 and 100, with 0 signifying that the proportion of Catholics and Protestants in an area was equal (i.e., greater community diversity), and with scores closer to 100 indicating that an area was mostly Catholic or Protestant (i.e., little community diversity). These community diversity scores were used in a meta-regression examining community diversity as a predictor of children's essentialism scores.

8.3. Results

8.3.1. Meta-Analysis

The results of the mixed effect meta-analysis, which can be seen in Figure 21, revealed that across all of the Northern Irish schools that participated in this project, children showed significantly more essentialist reasoning about ethno-religion categories than they did about the control categories (standard mean difference = 0.27, standard error = 0.05, 95% CI = [0.19,0.36], $Z(20) = 6.02$, $p < 0.001$). Further to this, the analysis showed that children attending segregated schools displayed evidence of significantly higher levels of essentialist beliefs about religion categories than about control categories (standard mean difference = 0.30, standard error = 0.05, 95% CI = [0.20, 0.40], $Z(14) = 6.00$, $p<0.001$). Importantly, children attending integrated schools did not show a significant difference between levels of essentialist beliefs about religion and control categories (standard mean difference = 0.15, standard error = 0.11, 95% CI = [-0.07, .37], $Z(6) = 1.34$, $p = 0.18$). However, the meta-analysis test of heterogeneity between school

Group by schooltype	Study	School	Std diff in means	Standard error	Variance	Lower limit	Upper limit	Z-Value	p-Value	Community Diversity
Integrated	study 1	School E	-0.197	0.211	0.044	-0.610	0.215	-0.937	0.349	1.000
Integrated	study 1	School F	0.336	0.171	0.029	0.000	0.672	1.962	0.050	59.900
Integrated	study 2	School I	-0.048	0.135	0.018	-0.313	0.216	-0.357	0.721	51.000
Integrated	study 3	School M	0.566	0.155	0.024	0.261	0.871	3.641	0.000	42.800
Integrated	study 3	School P	0.065	0.189	0.036	-0.305	0.436	0.346	0.729	34.500
Integrated	study 5	School S	0.113	0.146	0.021	-0.174	0.399	0.770	0.441	13.400
Integrated			0.153	0.066	0.004	0.023	0.283	2.311	0.021	
Segregated	study 1	School A	0.867	0.443	0.197	-0.002	1.736	1.955	0.051	66.270
Segregated	study 1	School B	0.236	0.162	0.026	-0.082	0.554	1.453	0.146	52.100
Segregated	study 1	School C	0.301	0.142	0.020	0.023	0.579	2.122	0.034	73.600
Segregated	study 1	School D	0.717	0.272	0.074	0.184	1.250	2.636	0.008	34.600
Segregated	study 2	School G	0.841	0.336	0.113	0.183	1.499	2.504	0.012	35.400
Segregated	study 2	School H	0.057	0.151	0.023	-0.238	0.353	0.380	0.704	46.000
Segregated	study 2	School J	0.289	0.175	0.031	-0.054	0.633	1.653	0.098	27.500
Segregated	study 2	School K	0.294	0.228	0.052	-0.153	0.742	1.288	0.198	7.800
Segregated	study 3	School L	0.185	0.161	0.026	-0.131	0.502	1.146	0.252	3.200
Segregated	study 3	School N	0.402	0.155	0.024	0.098	0.706	2.594	0.009	67.500
Segregated	study 3	School O	0.507	0.197	0.039	0.121	0.894	2.572	0.010	44.700
Segregated	study 3	School Q	0.270	0.163	0.027	-0.050	0.589	1.656	0.098	29.600
Segregated	study 5	School R	0.039	0.258	0.067	-0.467	0.545	0.151	0.880	86.400
Segregated	study 5	School T	0.303	0.181	0.033	-0.052	0.657	1.674	0.094	0.050
Segregated			0.300	0.050	0.003	0.202	0.398	5.999	0.000	
Overall			0.247	0.040	0.002	0.169	0.325	6.181	0.000	



Meta Analysis

Figure 21. Forest Plot showing the results of the meta-analysis examining differences in the effect sizes of children's ethno-religious essentialism scores within each educational sector in the current series of studies.

types was not significant, Q(1) = 1.56, p = 0.21. That is, the size of the effect in segregated schools was not significantly bigger than in integrated schools.

8.3.2. Meta-Regression

Analysis of the community diversity scores showed that scores ranged from 0.05 to 86.4. The mean community diversity score for wards where integrated schools were located was 29.0 (*SD*=20.27), and it was 43.2 (*SD*=26.41) for wards where segregated schools were located. Although the difference between these means was not significant, *t*(19)=1.17, *p*=0.26, Cohen's *d*=0.6, the direction of the difference suggests that integrated schools tend to be located within more religiously mixed areas. However, the results of the meta-regression analysis, which can be seen in Table 11 and Figure 22, revealed that level of community diversity was not a significant predictor of children's essentialist beliefs about religion categories in NI (regression coefficient=0.002).

Table 11. Results of the meta-regression examining community diversity as a predictor of essentialist reasoning in NI.

Covariate	Regression Coefficient	Standard Error	95% Confidence Interval	*Z*-value	*p*
Intercept	0.19	0.10	[-0.001, 0.380]	1.95	0.051
Community-Diversity	0.002	0.002	[-0.002, 0.006]	0.82	0.500

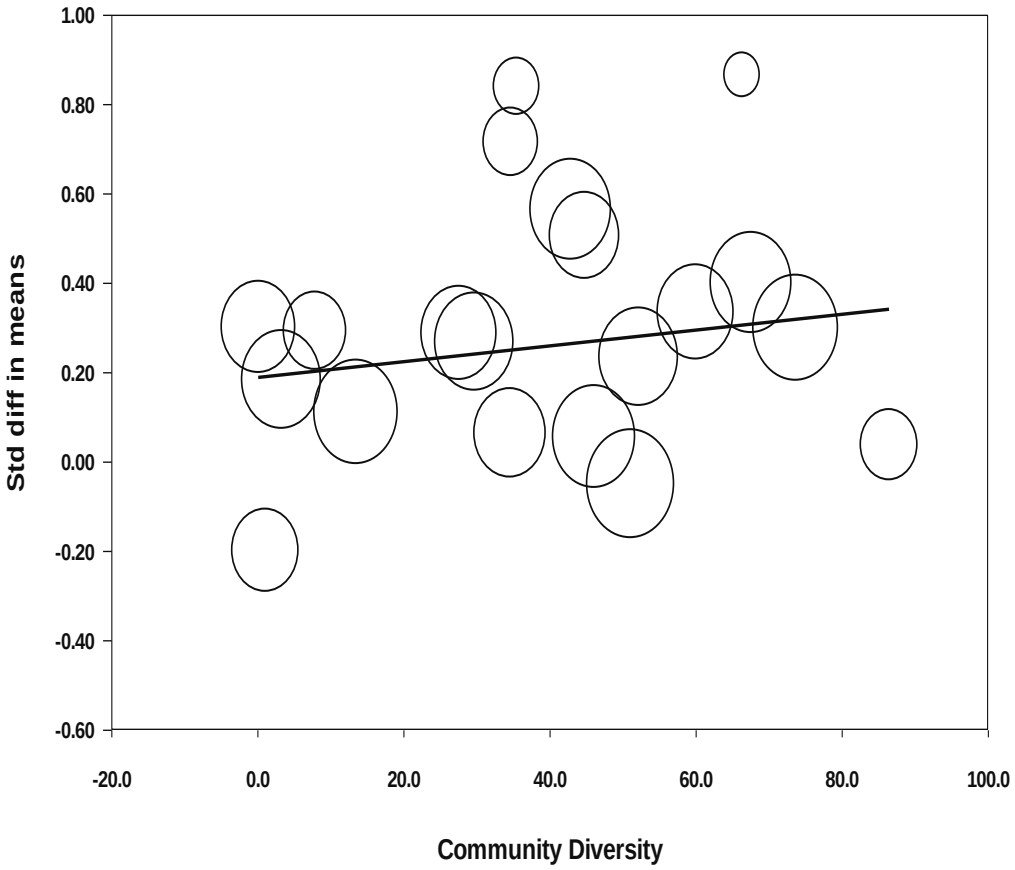


Figure 22. Scatterplot showing the relationship between the religious diversity of the community in which each school was located in the present research, and the standardized difference between children's religion and control category based responses. Higher community diversity scores indicate areas that were more homogeneous in their religious composition (lower scores indicate more religiously mixed areas).

8.4. Discussion

The results of the secondary analysis in this chapter support the conclusions drawn from the preceding studies about the effect of educational context on children's essentialist reasoning about religion categories. Namely, only children who attend *de facto* segregated schools in Northern Ireland hold stronger essentialist beliefs about ethno-religion categories than about the control categories. Children who attend integrated schools do not distinguish between the two social dimensions. Further to this, the current analysis also suggested integrated schools were located in electoral wards that were more religiously mixed than the wards where segregated schools were situated. Nonetheless, the results indicated that the level of community diversity in the areas where the schools were located was not related to children's essentialist beliefs about religion categories. This supports the conclusion that educational context, not community diversity, influences the development of children's essentialist beliefs about social categories in NI.

Limitations of the current analysis were that the community diversity scores were only an indicator of how integrated children's local communities might be, as children's addresses were not obtained at the time of data collection. Moreover, an analysis of age group within each educational sector could not be carried out because the number of participants was not large enough. Despite these limitations, the secondary analysis of the data compiled from this case study in Northern Ireland was still able to clarify that there do appear to be differences in the effects of different educational contexts on children's essentialist reasoning about social categories. It also indicated that community diversity is not a predictor of children's religion

essentialism scores. This reinforces the conclusions drawn from the results of the preceding experimental chapters, which future research can continue to build upon. Having drawn together the data from the previous studies for meta-analysis in the current chapter, the next and final chapter of this thesis will summarise the findings, consider their implications and outline directions for future investigation.

Chapter 9: General Discussion

9.1. Introduction

The aim of the current research was to conduct a case study of children's essentialist beliefs about ethno-religion categories in Northern Ireland (NI). We explored the developmental trajectory of children's essentialist beliefs from 6-11 years of age, within different educational contexts, using a series of inference tasks and a modified version of the Essentialism Components Questionnaire (ECQ) (see, Deeb et al., 2011; Diesendruck & Haber, 2009) as an index of beliefs about religion, gender and control categories. This research was based on a case study in Israel, examining children's essentialist beliefs about the ethnic categories, *Arab* and *Jew* (e.g., Birnbaum et al., 2010; Diesendruck & Haber, 2009; Deeb et al., 2011; Goldfein-Elbaz et al., 2013; Segall et al., 2015). The Israeli research demonstrated that ethnicity is strongly essentialised by Jewish children from 5 years of age, declining in strength across childhood, and at the earlier age of 7 years within the integrated school sector, compared to 10 years of age within the segregated school sector.

Based on the Israeli findings, it was hypothesised that children in NI would essentialise ethno-religion categories from 6 years of age and this tendency would decline in strength across childhood, and at an earlier stage of development within the integrated school sector than within the *de facto* segregated school sector in NI. It was assumed that children in NI and Israel might reason similarly about the most strongly emphasised social categories within their respective cultures – religion in NI and ethnicity in Israel – because the history surrounding these categories in both cultural contexts is one of violent, intergroup conflict between Catholics and Protestants in NI

and between Arabs and Jews in Israel (Bekerman, Zembylas & McGlynn, 2009; Deeb et al., 2011; Gelvin, 2014; Gillespie, 2010; Goldfein-Elbaz et al., 2013; Nolan, 2014; Spangler, 2015). The results that emerged from the case study in Northern Ireland revealed that this was not the case; a different pattern of reasoning across childhood was found in NI with children displaying strong essentialist beliefs about religion categories from 8 years of age onwards, with no sign of these beliefs declining at 10 years of age. Moreover, children's essentialist beliefs about religion were more likely to emerge within the context of segregated schools, with children attending integrated schools showing a lack of preference for religion over the control category, and in some cases (i.e., the inference tasks), gender.

In this general discussion chapter, I will provide a summary of the studies detailed in the preceding chapters of this thesis and I will discuss how the Northern Ireland case study relates to the existing social essentialism literature – in particular, to the case study of ethnic essentialism in Israel – and I will address the possible limitations of the present research and questions that have emerged for consideration in future research.

9.1.1. Summary of the present studies

The aim of the present section is to provide a brief recap of the preceding studies before discussing the findings in detail. To summarise, Studies 1-4 were inference studies which aimed to index the strength of children's essentialist reasoning about religion, gender and a control dimension by assessing their willingness to project novel attributes between

characters of the same and differing group memberships. This has commonly been used as an index of essentialist bias (e.g., see Birnbaum et al., 2010; Gelman & Markman, 1986; 1987) towards categories based on the reasoning that a stronger essentialist bias towards certain categories leads individuals to view members of such categories as more similar to one another and likely to share more obvious and nonobvious properties[7] (Gelman, 2003).

Study 1 consisted of a forced-choice task in which children had to choose between conflicting membership in two categories when choosing whether to draw an inference, while the other inference studies (Studies 2-4) employed an unconstrained version of the inference task in which children did not have to choose between competing category information when deciding whether to project a property. Children in this study could decide to project, or not project a property, based on whether two characters shared membership of the same social categories or not. Therefore, this task had the advantage of being able to measure children's absolute level of inference from each social dimension.

Studies 1-3 indicated that NI children essentialise ethno-religion categories from 8 years of age across a forced-choice task (Study 1) and unconstrained inference tasks (Studies 2-3), as well as in the absence and presence of additional visual cues about religion and control category memberships in the stimuli. Study 4 tested children in Boston and suggested

[7] This is the case unless some social categories are not essentialised along all of the aspects that underpin essentialist thinking, but rather are essentialised along one dimension of essentialism, such as entitativity or naturalness (e.g., as found by Haslam et al, 2000).

the opposite pattern of reasoning about religion categories to that observed within NI, with US children displaying weaker essentialist reasoning about the religion categories, *Catholic* and *Protestan*t, across childhood.

Study 5 (see Chapter 7) consisted of the ECQ (Deeb et al., 2011; Diesendruck & Haber, 2009), which examined essentialist beliefs about the distinctiveness and stability of religion, gender and the control categories in NI. Using this measure of essentialism reinforced the conclusions drawn from the inference studies that ethno-religion essentialism emerged at 8 years of age in NI, and that attendance at a segregated school influences this. In contrast to the preceding findings, the ECQ approach suggested that different dimensions of essentialist thinking were underlying children's reasoning about the categories in this research. The findings indicated that gender was more strongly essentialised than religion along the aspects of distinctiveness and stability, while the stronger inductive potential of religion suggests religion is essentialised more strongly along the aspects of cohesion and entitativity.

Due to some of the inconsistences that emerged between the three induction studies conducted in NI – i.e., Study 1 indicated effects of educational context from 8 years of age, Study 2 showed weaker effects of educational context compared to Study 1, and no effect of educational context was found in Study 3 – it was decided that a secondary analysis (see Chapter 8) of all data collected in NI (i.e., Studies 1, 2, 3 & 5) might clarify the effect of educational context on children's reasoning about religion categories. This analysis supported the conclusion that essentialist

reasoning about religion categories in NI is influenced by attending religiously homogeneous schools, rather than by level of community diversity.

Before moving on to the discussion of these findings, it should be noted that in analysing the data from Studies 1-5 in this thesis I conducted both paired sample t tests and one sample t tests. This was done in order to provide a more complete picture of the trends running through the data, which conducting one of these analyses alone would not have provided. This is because the paired t tests showed children's preferences for one category relative to another, while the one sample t tests revealed whether children's essentialist reasoning about each category could be predicted by chance alone. For example, in Study 3 the paired t tests showed that children made more inferences based on religion categories than they did based on gender across development. However, the one sample t tests provided further insight into how children reasoned about gender across development. From 6-9 years of age children's rate of inference based on gender group membership did not significantly differ from chance, while at 10-11 years of age children's rate of inference based on gender group membership was significantly greater than chance level. This suggests that as children got older there was an increase in the value they placed on information about gender group membership when drawing inferences, even though children continued to view gender as a less informative basis for inference than religion group membership.

In the next section, I will discuss how the NI case study fits with previous research, and the findings from the Israeli case study in particular, which the current research is based upon.

9.2. The constraints of cultural context

The first question that the current research aimed to address was the question of whether children living in Northern Ireland hold stronger essentialist beliefs about religion categories than they do about other available categories, given the region's history of sectarian conflict. This is exactly what the present research has found, similar to previous research in the literature, which has shown that cultural input about the importance of specific categories can lead children and adults to essentialise those categories more than others (Astuti et al., 2004; del Rio & Strasser, 2011; Giles et al., 2008; Kim, 2013; Kinzler & Dautel, 2012; Pauker et al., 2016; Rhodes & Gelman, 2009). For example, in Chile it has been reported that children there hold stronger essentialist beliefs about poverty than they do about other categories (i.e., del Rio & Strasser, 2011), in the US children living in a rural, conservative area essentialise gender and race strongly from 10-17 years while their counterparts in an urban area do not (i.e., Rhodes & Gelman, 2009), and in Israel children essentialise ethnicity more strongly across childhood than children in the US (i.e., Diesendruck, Goldfein-Elbaz et al., 2013). In comparison to the case study of ethnic essentialism in Israel, the main similarity between children in NI and Israel is that both highly essentialise the most strongly emphasised social categories within each cultural context; children in NI strongly essentialise religion categories and children in Israel strongly essentialise ethnic categories (e.g., Birnbaum et al., 2010; Diesendruck, Goldfein-Elbaz, 2013, Diesendruck & Menahem, 2013).

Children in NI essentialised the ethno-religion categories, *Catholic* and *Protestant*, more strongly than gender or a control dimension, which was expected given Northern Ireland's history of sectarian conflict between these two religion groups (see Gillespie, 2010), and the ethno-religious polarisation and intergroup tension that persists to this day (Gough et al., 1992, Nolan, 2014). Despite the end of The Troubles, as brought about by The 1998 Good Friday Agreement, NI peace reports (e.g., Nolan, 2014) periodically point out that Northern Ireland by no means functions as a successful post-conflict society. Similarly, Israel and the Palestinian territories have a history of violent inter-ethnic conflict between Israeli Jews and Palestinian Arabs, which continues to this day (see Gelvin, 2014; Spangler, 2015) – in contrast to NI, Israel is not a post-conflict society. This would account for children's strong essentialist beliefs about ethnicity in Israel (e.g., Birnbaum et al., 2010; Diesendruck & Haber, 2009). Another similarity between the NI and Israeli research is that both case studies include data obtained from US children on the eastern coast (Boston and New York), and it was found that children in the US did not reason about religion categories in the same way as children from NI, and children in the US did not reason about ethnic categories in the same way as children from Israel (i.e., Diesendruck, Goldfein-Elbaz et al., 2013). In Study 4 of the present research, essentialist beliefs about religion categories were found to become weaker across childhood in the US. Meanwhile, Diesendruck, Goldfein-Elbaz et al. (2013) found that Israeli children essentialised ethnicity strongly across childhood (at 5 and 10 years of age), while US children did not but showed an increase in essentialist reasoning about ethnicity between 5 and 10 years of age. These

findings suggest that American children may receive input indicating that religion or ethnicity is not as important as other social categories in their culture – for example, in comparison to race (Hirschfeld, 1995; 1996; Kinzler & Dautel, 2012; Pauker et al., 2016) – which could account for their weaker essentialist beliefs about Catholics and Protestants, and Arabs and Jews.

Thus, the current research in NI fits with the previous research in the literature and in Israel, suggesting that children are sensitive to cues highlighting particular group memberships as highly salient and especially important social categories to rely on for drawing distinctions between people. However, the age at which NI children's essentialist bias becomes constrained by cultural input about ethno-religion categories appears to be later in development in comparison to the development of Jewish, Israeli children's essentialist reasoning about ethnicity (e.g., Birnbaum et al., 2010). The following section will discuss the developmental trajectory of essentialist reasoning about ethno-religion categories in NI.

9.3. Developmental trajectory

The second aim of the current research was to explore the developmental trajectory of NI children's essentialist beliefs about religion categories. In Israel, evidence of strong ethnic essentialism in childhood is apparent from at least 5 years of age (this is the youngest age that has been tested there), and appears to decline in strength across childhood (Birnbaum et al., 2010; Deeb et al., 2011; Diesendruck & Haber, 2009). In contrast, strong essentialist reasoning about religion categories emerges at 8 years of age

amongst children in Northern Ireland, and shows no sign of declining at 10-11 years of age. This is contrary to our initial expectations on beginning this case study; it was hypothesised that children in NI and Israel would be likely to show a similar pattern of essentialist reasoning about religion and ethnicity respectively, because of their similar histories of intergroup conflict and the continued polarisation of ethno-religion groups within both societies (see Gelvin, 2014; Gillespie, 2010; Gough et al., 1992; Nolan, 2014; Spangler, 2015). However, this was not the case, and as I will now discuss, there are also differences between the Northern Ireland and Israeli contexts that might account for the different patterns of social essentialism observed.

One explanation for the difference in developmental trajectory between NI and Israel may be that children in NI might not have well developed concepts of religion until around 8 years of age, due to religion group membership not being salient to very young children. The post-conflict research in NI conducted by Connolly and colleagues supports this view (Connolly, 2009; 2011; Connolly et al., 2009; Connolly et al., 2002), as a series of studies have reported that while children as young as 3 years of age show a developing awareness of cultural markers associated with their own religion group membership (i.e., such as a preference for certain flag colours, cultural activities and sports), it is not until around 6-7 years of age that approximately one third of children categorized themselves as Catholic or Protestant, with some children even displaying negative attitudes towards the other group. So while children in NI may begin to internalise symbols of ethno-religion group membership in early childhood, it may not be until later in childhood that the majority of children in NI are explicitly aware of the

significance of religion group membership in this society. Thus, for many children at 6 years of age in NI, the labels *Catholic* and *Protestant* may be relatively novel categories to them until cultural input can influence the conceptual development of these categories.

One reason why religion group memberships might not be especially salient to children in Northern Ireland during early childhood, is that there are no physical differences in appearance between Catholics and Protestants in NI (although this has not stopped adolescents in the past from believing that there are, i.e., see Stringer & Cairns 1983 for research on this) that might act as cues to category membership. Other theorists in the social essentialism literature (e.g., Gil-White, 2001; Hirschfeld, 1995; 1996) have previously conjectured that physical or visual cues to category membership (e.g., for race) could be an important factor in directing essentialist beliefs onto human categories, because people may process physical differences between social groups in the same way they do physical differences between species of animal. In contrast to NI, ethnic categories in Israel do have distinguishing visual markers (e.g., such as clothing), and Arabs and Jews in Israel also speak different languages, which is likely to make ethnicity more salient to children there from a younger age (Birnbaum et al., 2010; Deeb et al., 2011; Diesendruck & ha Levi, 2006), and lead children in Israel to essentialise ethnicity from at least 5 years of age (e.g., Birnbaum et al., 2010; Deeb et al., 2011; Diesendruck & Menahem, 2013; Segall et al., 2015).

Recent research on religion categories in the US has also suggested that essentialist beliefs about religion categories emerge in middle childhood there, and supports the current research conducted in NI and Boston. Chalik

et al. (2017) examined 5 and 10 year old children's essentialist reasoning about Christianity and Judaism and found that found that US children did not distinguish between each religion category and the control category (e.g., the flurpish religion) at 5 years of age. Constraints appeared later in childhood and persisted into adulthood; Jewish 10 year olds and adults who practised their religion endorsed essentialist beliefs about familiar religion groups more than novel religion groups, and they also essentialised their own religion more than Christianity, in comparison to children and adults who were Christian or non-religious Jews. This, along with the current case study, may reflect a universal pattern of late-emerging essentialist beliefs about religion categories when there are no visible cues that make religion categories salient to young children, but future research would need to confirm this.

Another reason why religion group membership might not be as salient for younger children in NI is that religion might not be as strongly emphasised to all children in NI society today as it perhaps was during The Troubles, as NI is now considered a post-conflict society since The 1998 Good Friday Agreement (see Gillespie, 2010; Nolan, 2014). Due to this, it is possible that religion categories are less salient to young children in NI, if there is less explicit discussion about religion categories by parents or in the media than there would have been during The Troubles (i.e., research in the essentialism literature has demonstrated a strong link between parents' generic language, parental labelling of categories, and the development of essentialist thinking about natural and social categories in early childhood, see Gelman, 2003; Gelman et al., 2008; Goldin-Meadow et al., 2005; Pappas & Gelman, 1998; Rhodes et al., 2013). However, as this was not measured

in the current research, there is no way to know how much influence parental talk – or the possible lack of it – about religion categories may have influenced children's essentialist reasoning in the present research. In contrast to the situation in NI, Israel and the Palestinian territories still have no resolution to the conflict there (see Gelvin, 2014; Spangler, 2015), so it is likely that children in Israel are exposed to talk about ethnicity and the conflict there from early in childhood. Indeed, recent research by Segall et al. (2015) examined this and found that Jewish parents who held stronger essentialist beliefs about ethnicity, labelled ethnic categories more, and held more negative attitudes towards negotiating with Palestinian Arabs. They also had children who exhibited stronger essentialist beliefs and negative attitudes towards Arabs at 5 years of age.

In addition to the late emergence of essentialist reasoning about religion categories in NI, the present research also differs from the case study in Israel by showing no sign of a decline in the strength of children's essentialist beliefs about religion categories at 10 years of age. In fact, in the present research, religion essentialism became stronger from 8 to 10 years of age in NI, while in Israeli children show a decline in the strength of their essentialist beliefs about ethnicity between 7 and 10 years of age (i.e., Birnbaum et al., 2010; Deeb et al., 2013). This may be because knowledge and essentialist beliefs about religion categories in NI emerges relatively late in comparison to ethnic essentialism in Israel, so it may follow that ethno-religion essentialism in NI also declines later in childhood, if it eventually does. There is also the possibility that ethnic essentialism does not really decline from middle childhood onwards in Israel but only appears to. It may

be that as Jewish children get older they realise that stereotypical thinking about ethnic categories is not socially acceptable and so they modify their responses and choose to privilege ethnicity less when reasoning about others, and show a more similar pattern of reasoning to the adult participants (Birnbaum et al., 2010; Deeb et al., 2011; Diesendruck & ha Levi, 2006; Diesendruck & Haber, 2009). Research that has demonstrated this has been reported by Eidson and Coley (2014) who discovered that when US adults participate in the switched at birth task under time pressure, they endorse essentialist beliefs about the behavioural properties associated with gender categories, while adults who do not have a limited time to respond do not show this bias. This is in contrast to studies that have suggested that US children view the stereotypical behavioural properties associated with gender as flexible by 10 years of age and into adulthood (i.e., Rhodes & Gelman, 2009; Taylor, 1996; Taylor et al., 2009). Thus, older children and adults in Israel may continue to hold strong essentialist beliefs about ethnicity, but modify their responses on essentialism tasks when they are under no time pressure to respond. This has been observed in other research that has examined how children respond to tasks under norms of social inclusion or exclusion (Fitzroy & Rutland, 2010; Nesdale, 2011; Rutland, Cameron, Milne & McGeorge, 2005). Meanwhile, children who essentialise religion group membership in NI may continue explicitly to do so throughout adolescence and adulthood, but this is as yet unexplored.

Evidence of essentialist reasoning about ethnicity in adulthood – including explicit expressions of inter-ethnic bias – has been found among Jewish adults in Israel, and these views appeared to impact on their children

(i.e., Segall et al., 2015). Further to this, not all of the studies in Israel have shown a decline in ethnic essentialism by 10 years of age; Diesendruck, Goldfein-Elbaz et al. (2013) found that Jewish children treated ethnicity as highly natural and objective at 5 years of age as they did at 10 years of age. Diesendruck, Birnbaum et al. (2013) discovered two different patterns of reasoning about ethnicity in Israel depending on the measure of essentialism used; it was found that children did not privilege ethnicity over other categories (social status, occupation and body build) until 7-11 years of age when asked to reason about the heritability of categories in a forced-choice paradigm, while 5-7 year olds essentialised ethnicity more strongly than 11 year olds when asked to reason about its innate potential in a switched-at-birth task. The difference between the two tasks was that the forced-choice, heritability task measured children's essentialist reasoning about one dimension relative to another (similar to the forced-choice inference task in Study 1 of this thesis), while the switched-at-birth task did not require children to choose between competing social dimensions and so children's absolute level of ethnic essentialism could be measured. Thus, this study in Israel (Diesendruck & Birnbaum et al., 2013), like the current NI case study, highlights the importance of employing different measures of essentialist reasoning in conjunction with each other in order to obtain a fuller picture of how children reason about categories – a point which will be discussed further in section 9.1.5. on children's reasoning about gender in the NI case study. In the next section, I will discuss the effect of educational context on children's essentialist reasoning in NI.

9.4. The effect of educational context

The third aim of the current case study in NI was to examine the potential effects of different educational contexts on children's essentialist reasoning about religion. Northern Ireland offers a unique context for exploring the effects of intergroup contact on children's developing social cognition due to the largely segregated school system in place, along with the smaller integrated sector, attended by approximately 5% of children in NI (Gallagher, 2010, Northern Ireland Statistics & Research Agency, 2014). In this way, Northern Ireland is also similar to Israel, which has a minority of bilingual, integrated schools attended by both Arabs and Jews; another factor making the Israeli case study a good basis for comparison (Bekerman & Shhadi, 2003; Bekerman, Zembylas & McGlynn, 2009; O'Connor, 2002). Based on the findings from Israel, it was expected that children in the integrated sector would display weaker essentialist beliefs about ethno-religion categories at an earlier age than their counterparts in segregated schools. However, this was not the case in NI; essentialism of religion categories emerged at 8 years of age within the segregated sector, while children in the integrated sector did not show a preference at any age.

One explanation for this finding may be that differences between the unique social contexts of NI and Israel that the integrated and *de facto* segregated education systems operate within may be responsible. As differences between religion groups are not visually salient in NI, and there is no longer a violent conflict between the two groups, attendance at a school with a religious ethos and relatively homogenous student population might actually serve to highlight religion as a highly cohesive category, and as an

important social dimension used to draw distinctions between people. In contrast, attending an ethnically homogeneous school in Israel may do nothing to make ethnicity more salient if young children are already highly aware of ethnicity before they begin school (i.e., Deeb et al., 2011, Segall et al., 2015), due to the visual and linguistic markers that are likely to make ethnicity more salient in this society. Further to this, Israel constitutes a much more highly segregated society than NI (e.g., Schnell, Abu Baker Diab & Benenson, 2015) in terms of residential and social segregation; while residential segregation persists in NI, the level of segregation varies in degree across different areas. While many towns and villages are extremely homogeneous and insular, others are highly mixed in religious/community background, and both sides of the community are willing to share public space (e.g., Gallagher, 2010; Gough et al., 1992; Lloyd & Shuttleworth, 2012; Nolan, 2014).

Thus, attendance at an integrated school in Israel may be the first time Jewish and Arab children have ever had contact with each other, and this contact might be responsible for attenuating ethnic essentialism among integrated school children at an earlier age, if it is experienced under optimal conditions (see Everett, 2013; Pettigrew, 1998) (for positive effects of physical, and even imagined, intergroup contact on school children, see Hughes, 2014; Turner et al. 2013). Meanwhile, many children in NI may have had intergroup contact before beginning school, but might not be particularly aware of it, until they start attending a segregated school where religion group membership is strongly emphasised to them. Meanwhile children who attend integrated schools are less likely to be conditioned to

view religion group membership as a highly meaningful social dimension due to the inclusive ethos of integrated schools and the cross-group friendships they form with other children (Bekerman & Shhadi, 2003; Bekerman et al., 2009; O'Connor, 2002).

This would explain why NI children in the integrated sector never distinguished between religion and the control categories (as well as gender in the inference studies), and often responded at chance, in their endorsement of essentialist beliefs about these categories, while stronger essentialist reasoning about religion categories emerged at 8 years of age among children attending segregated schools. This interpretation is further supported by the results of the meta-regression, which revealed that the level of religious diversity in children's local communities did not predict their essentialist reasoning about religion categories, indicating that the effects of educational context in this research cannot by attributed to level of community diversity. However, future research should attempt to replicate this finding, as the level of community diversity in children's local areas was an estimate obtained on the assumption that all children lived in close proximity to their school. While proximity to school is one of the selection criteria for school admissions in NI, the community diversity scores are still an estimate based on the electoral wards that school were located within. It would have been preferable to have had children's postcodes to work out the religious composition of their local community, which was not obtained at the time of data collection in the current research.

Alternately, it may be the case that parents who are less essentialist in their reasoning about religion categories prefer to send their children to an

integrated school, and the opportunities for socialization that they provide for their children outside of school are more diverse than those of children whose parents prefer a segregated school. Thus, it may be the parents who are influencing the development of essentialist reasoning about religion categories within the different educational contexts, rather than the educational contexts themselves per se. Future studies need to unpick the exact mechanisms by which educational context comes to influence the development of children's social essentialist reasoning, and whether it is the educational context itself that is driving this finding. There are a number of explanations that may account for the observed differences in reasoning between children within the different educational sectors in the current research.

One possibility may be that exposure to social diversity causes children to develop weaker essentialist beliefs about social categories, while a lack of exposure to social diversity may exacerbate essentialist reasoning – similar to the effect that successful intergroup contact has on attitudes and emotions (e.g., Hughes, 2014; Hughes et al., 2013; Turner & Crisp, 2009; Turner et al., 2013). If an essentialist bias constitutes one of the potential socio-cognitive mechanisms underpinning the development of stereotyping and prejudice, then it is reasonable to assume that any intervention that reduces stereotyping and prejudice might operate by challenging essentialist reasoning about the social world or particular social categories. This interpretation is supported by research, which has shown that cross-group contact can effect change at a cognitive level by causing people to engage in de-categorization (Crisp & Turner, 2011; Everett, 2013; Prati, Crisp, Meleady

& Rubini, 2016), which occurs when people view others as individuals rather than as members of groups. De-categorization is likely to occur in socially diverse environments when people are faced with multiple social categories that another individual belongs to (e.g., a Muslim person might also be a female, a young person, a feminist, a doctor, a mother) and simple, binary categorization is not easy to perform.

For example, Prati et al. (2016) reported that when university students were presented with complex, multiple category information about students from another university or about immigrants, they viewed those people more as individuals, they attributed more secondary human emotions to them, and they viewed them as less of a threat. This was compared to the responses of participants who were presented with simple category information about others, in which case participants dehumanized other university students and immigrants more and felt more threatened by them. Thus, if being presented with multiple category information encourages people to engage in less category-based reasoning about others, it is likely that the process of de-categorization also challenges and breaks down essentialist beliefs about categories, maybe even encouraging an anti-essentialist view of social categories instead (however, as Crisp & Turner, 2011 pointed out, people need to feel motivated to engage in de-categorization, or they will dismiss personal information about others that contradict their stereotypes, or will not engage in contact, as found by Hughes, 2014 in certain schools in NI participating in the Shared Education Programme). This may be one of the ways that attendance at an integrated school in NI might have influenced children's lack of endorsement of religion over gender and the control

categories in the inference studies detailed in this thesis, and the lack of distinction drawn between religion and the control categories when reasoning about the stability of these categories by integrated school children in Study 5.

Another mechanism by which educational context in NI might impact on the development of social essentialist beliefs is through the operation of school norms. Integrated education is an intergroup contact initiative established with the goal of improving intergroup attitudes and intergroup relations in NI (Gallagher, 2010; Gallagher & Coombs, 2007; Hewstone et al., 2005; O'Connor, 2002; Smith, 2001). As such, the ethos of an integrated school is one that promotes inclusion, tolerance, and respect for others as individuals. In this way, integrated schools set values and norms for social behaviour that children are aware of and know they are expected to adhere to (NI children as young as 6 years of age are aware of the ethos of their integrated school, see Montgomery, Fraser, McGlynn, Smith & Gallagher, 2003). These school values and norms may have led integrated school children to view religion group membership as equal in importance to the other categories in the present studies. Previous research has demonstrated the power of environmental input over children's developing social cognition; Astuti and colleagues (2004) found that protracted environmental input de-emphasising the biological basis of ethnic group membership in Madagascar eventually overrides children's essentialist instinct to view ethnicity as biologically innate and heritable by the time they reach the end of adolescence. Thus, the values and norms of the integrated sector may be internalised by children and moderate their essentialist bias. Prior research

(e.g., Cameron, Rutland, Hossain & Petly, 2011; Turner et al., 2013) has found that the creation of ingroup norms favouring cross-group contact can lead to more positive attitudes and feelings towards the outgroup and the idea of direct contact. This would account for the present findings that integrated children did not endorse stronger essentialist beliefs about religion at any age, while segregated school children privileged religion categories from 8 years of age.

Another way that the school norms of the integrated sector might have influenced children's responses in the current research is by leading children to modify their answers during the tasks; it is possible that integrated children may not have been answering questions honestly, but rather in line with their school norms about socially acceptable ways to think about others. Previous research has demonstrated that social norms can have a powerful impact on social cognition, social behaviour, and the responses children give to experimenters (see Fitzroy & Rutland, 2010; Nesdale, 2011; Pauker, Apfelbaum & Spitzer, 2015; Rutland et al., 2005). For example, research by Fitzroy and Rutland (2010) reported evidence that 6-9 year old children modify their expressions of ingroup bias and outgroup bias under different levels of scrutiny by others; when children believed that their teacher and other children in their class would see their responses to tasks measuring intergroup bias they gave more socially acceptable responses in line with anti-prejudice social norms. Older children (8-9 year olds) who had a better understanding of others' emotions seemed to internalise norms more and made more effort to control their intergroup bias under conditions of both high accountability (scrutiny of peers and teacher) and low accountability

(accountable only to the experimenter). If children who participated in the current studies in NI were sensitive to the fact that we were most interested in how they think about Catholics and Protestants, then it is possible that from 8 years of age (the age when children attending separate schools begin to essentialise religion more strongly), children attending integrated schools may have controlled their responses to the inference tasks and the ECQ to present themselves as placing the same value on religion group membership as they do on other categories, in line with the ethos of their school.

Future research should examine the role of school and ingroup norms on the development of children's essentialist beliefs about religion categories in NI. It would be interesting to see how children respond to measures of essentialism within different educational contexts under low accountability (experimenter only) and higher accountability of different types, for example, when they think school peers will see their responses, when they think teachers will see their responses, when they think their parents will see their responses, and when they think their friends in their neighbourhood will see their responses. It would also be interesting to know if children internalise the norms of their school and whether this is related to differences in explicit and implicit intergroup attitudes, as well as explicit and implicit essentialist thinking about religion categories (explicit and implicit essentialist reasoning could perhaps be measured using an adaptation of the computerized task employed by Eidson & Coley, 2014, who examined essentialist reasoning under time constraints and under no time constraints at all).

A final explanation for the current pattern of results may be that educational context is not the driving force behind the differences in

children's essentialist reasoning about religion categories. It may be that parental input determines the direction of children's reasoning about others, and parents who choose an integrated school may be less essentialist about religion categories than parents who choose a segregated school for their child. This was found in a recent study by Segall et al. (2015), who reported that Jewish parents who preferred segregated schools in Israel displayed stronger essentialist beliefs about ethnicity – as did their children - than parents (and their children) who chose integrated schools. Parents who preferred segregation also labelled ethnic categories more and expressed more negative stereotypes about the outgroup. Prior research has shown that generic language about natural kinds influences the development of essentialist beliefs about natural categories in childhood, for example, in observational studies of parent-child talk and story-telling (Cimpian & Markman, 2011; Gelman, Goetz, Sarnecka & Flukes, 2008; Gelman & Heyman, 1999; Goldin-Meadow, Gelman & Mylander, 2005; Pappas & Gelman, 1998; Rhodes, Leslie & Tworek, 2012). However, Segal et al.'s is one of few studies in the social essentialism literature that has demonstrated a link between essentialist beliefs and prejudicial attitudes of parents, and the social essentialist reasoning of their children (see also, Gelman, Taylor, Nguyen, Leaper & Bigler, 2004; Rhodes et al., 2012). Future research into the development of children's reasoning about religion categories in NI (and in other cultural and social contexts) should explore the potential impact of parental talk on the development of children's essentialist reasoning. While the meta-analyses ruled out varying levels of community diversity influencing children's essentialist reasoning in the current studies, it is possible that

parental input about religion categories in NI may have had a large impact on the development of their essentialist beliefs about religion. Thus, perhaps parents who chose integrated schools in NI, may have done so because they themselves are less essentialist about religion categories. Alternatively, it may be the case that it is particular aspects of the differing school environments (level of social diversity, school norms) that influence essentialist reasoning, as past research has reported a number of reasons why NI parents choose an integrated school - the integrated ethos of the school is not always the primary motivating factor (see Morgan, Dunn, Cairns & Fraser, 1993). Other reasons parents choose integrated schools are: that class sizes tend to be smaller so teaching is more 'child-centred', the school has a good reputation, older siblings attended the school, and the location of the school was convenient. Thus, if intergroup contact is not the reason why many parents choose an integrated school, then parental input alone might not be what constrains integrated children's essentialist reasoning about religion categories.

As highlighted in this section, there are various reasons why children educated in different sectors in this research may have shown differences in essentialist reasoning. The exposure to social diversity within the integrated sector is one mechanism that may have prompted de-categorization, and prevented children from developing stronger essentialist beliefs about religion categories at 8 years of age, in contrast to segregated school children. Alternatively, it may be that the inclusive ethos and pro-contact norms of the integrated sector may have moderated children's essentialist beliefs about religion categories in the current studies, via the internalisation of these

norms or by prompting children to respond in a socially acceptable way in line with the ethos of the school. Additionally, it may be that children who attend integrated schools are less essentialist about religion categories because their parents are also less essentialist about religion categories, which is why they have chosen an integrated school for their child. In this case, it may be parental input and socialization de-emphasising the importance of religion categories that causes integrated children to essentialise religion less. Further to this, it should be noted that while the present research found no evidence that community diversity influences children's essentialist reasoning about religion categories, this finding should be replicated by future research. The most likely answer is that a combination of these factors mediates and moderates the development of essentialist beliefs about religion categories across childhood in NI. Future research needs to examine these mechanisms together to find how much each one influences children's essentialist beliefs about religion categories. In the next section, I will discuss the findings that emerged in relation to the dimensions underpinning children's essentialist reasoning about gender and religion categories in the current research.

9.5. The underpinnings of children's essentialist reasoning about gender and religion categories

In examining the development of children's essentialist reasoning about religion categories in NI, the current research sought to obtain converging evidence of essentialist reasoning by using more than one measure. Thus, the inference studies measured children's beliefs about how informative and

cohesive religion categories are, and the modified Essentialism Components Questionnaire (ECQ) measured children's beliefs about how distinctive and stable religion categories are. By examining different essentialist beliefs about social categories, the current case study revealed that religion and gender categories were essentialised in different ways. Children appeared to essentialise religion categories along the dimension of cohesion more than naturalness, while they essentialised gender in terms of naturalness more so than cohesion.

It was initially surprising that children in NI and Boston did not treat gender categories as a strong basis for inference. This is because it is a well-established finding that gender is a highly important social dimension to young children (for reviews, see Halim & Ruble, 2010; Leaper & Friedman, 2007) Gender research has shown that in the first year of life, infants discriminate between male and female voices and faces, in their second year children frequently use gender labels and display preferences for stereotypically gendered toys, clothes and games (Halim & Ruble, 2010; Leaper & Friedman, 2007), and from 3-4 years of age children prefer to play with other children of the same gender (Maccoby, 1988; 2002) and even use gender categories to make inferences about the predicted toy preferences of other children (Martin, Eisenbud & Rose, 1995), Research on gender essentialism has also demonstrated that children hold strong essentialist beliefs about gender categories from 4-5 years of age (Gelman et al., 1986; Taylor, 1996; Taylor et al., 2009; Rhodes & Gelman, 2009).

However, while research examining gender socialization has highlighted the importance of this social dimension in early childhood, it has

also shown that across childhood children become more flexible in their reasoning about gender stereotypes (Halim & Ruble, 2010; Leaper & Friedman, 2007) and the behavioural properties associated with gender (as does gender essentialism research, i.e., Taylor, 1996; Taylor et al., 2009). Moreover, Trautner, Ruble, Cyphers, Kirsten, Behrendt and Hartmann (2005) examined gender stereotyping from 4-9 years of age and found that gender stereotyping peaks in middle childhood and is then typically followed by increased flexibility in reasoning about gender categories (although there can be individual differences in the exact age at which gender stereotyping peaks before becoming less rigid). Based on this research on the development of gender socialization, it seems possible that children's reasoning about gender may have reached peak rigidity by 6-7 years of age in the current research, and therefore, children may have been less willing to draw novel inferences on the basis of gender group membership if they had already began reasoning about gender in less stereotypical ways.

Further to this, children who participated in the current inference studies may also have been extremely familiar with gender categories, causing this social dimension to lose inductive potential. If children have a great deal of knowledge and experience with gender categories by 6-7 years of age (when gender constancy has developed, Halim & Ruble, 2010), then children may be highly aware that only the biological properties associated with gender are fixed and that there can be as much variability between members of the same gender in behavioural properties, as there is between members of different genders. Thus, extreme familiarity with gender categories might lead children to view gender categories as less cohesive

and inductively potent than other social dimensions (for more on this see Waxman, 2012), and increase the perception of within group variability. Other inference studies have found similar results when gender has been presented alongside other social categories that children could choose to base an inference on (for age versus gender see Taylor & Gelman, 1993; for ethnicity, social status and religiosity versus gender see Diesendruck & ha Levi, 2006; Birnbaum et al., 2010).

While children who participated in the current research did not treat gender categories as particularly cohesive and informative, they did perceive gender as a highly natural category as revealed by our modified version of the ECQ. The ECQ suggested that from 8 years of age, children in NI viewed gender categories as highly distinct, discrete in their category boundaries and stable across time and different situations. These are all aspects of essentialist reasoning that tend to be associated more with a naturalized view of categories (e.g., see Haslam et al., 2000; Taylor, 1996). In contrast to children's reasoning about gender, children only essentialised religion group membership over membership of the control categories in terms of stability from 10 years of age within the segregated school sector. Religion categories were not essentialised as particularly distinct or discrete categories, as measured by the ECQ. This is consistent with prior research that has reported that an essentialist perception of different social categories tends to be underpinned by different aspects of essentialist thinking, which do not always cohere (i.e., Demoulin et al., 2006; Gelman et al., 2007; Haslam et al., 2000; Rangel & Keller, 2011). For example, Haslam and colleagues (2000) examined adults' essentialist endorsements of 40 different

social categories and found that participants' essentialist beliefs formed two main components – naturalness and entitativity. For categories such as gender or race, Haslam et al. found that adults endorsed more essentialist beliefs about the naturalness of these categories, while categories such as occupation, religion or political orientation were essentialised more strongly along the dimension of entitativity (or cohesion). Thus, the current case study of essentialist reasoning about social categories in NI would suggest that religion categories are viewed by children as being highly cohesive, homogeneous and informative categories, while gender categories are seen as more naturally occurring, stable, and distinctive in their boundaries. These findings highlight the need for future studies of social essentialist reasoning to take more than one approach to measuring essentialist beliefs, as different approaches tap into different aspects of essentialist thinking. Thus, converging evidence of essentialist reasoning is needed to provide a more complete picture of the ways in which children and adults essentialise different categories.

To summarise, the current research is consistent with prior research (e.g., Demoulin et al., 2006, Diesendruck & Haber, 2009; Haslam et al., 2000; Rangel & Keller, 2011) in finding two main factors or dimensions of thought underlying an essentialist perception of social categories. Interestingly, we found that gender was essesntialised strongly along the dimension of naturalness, while religion appeared to be essentialised more strongly along the dimension of entitativity. In the next section of this general discussion chapter, I will address the limitations of the current research studies and the questions that remain unanswered for future research.

9.6. Limitations and future directions

Although a strong argument can be made for the positive contribution made by the studies described in this thesis, nonetheless, these studies, like all studies, suffer from certain limitations. In addition, certain assumptions on which they are based might be called into question. Accordingly, before discussing suggestions for future research, it is important to assess the potential limitations of the current findings.

9.6.1. Limitations of the current research

One limitation faced by all research examining essentialist thinking is that essentialism cannot be directly measured; all approaches to studying essentialism are comprised of indirect measures of essentialist reasoning (Gelman, 2003). Indices of essentialist reasoning that are commonly cited in the literature are: inductive inference tasks measuring the inductive potential of categories (e.g., Birnbaum et al., 2010; del Rio & Strasser, 2011; Gelman & Markman, 1986; 1986), transformation scenarios examining the discreteness and stability of category boundaries (e.g., del Rio & Strasser, 2011; Gelman & Wellman, 1991; Keil, 1989; Mahalingam, 2003), switched-at-birth tasks measuring the perceived innate potential and heritability of category membership (e.g., Astuti et al., 2004; Diesendruck, Birnbaum et al., 2013; Hirschfeld, 1995; 1996; Taylor, 1996; Taylor et al., 2009), and questionnaire approaches exploring a range of essentialist beliefs (e.g., Deeb et al., 2011; Diesendruck & Haber, 2009; Haslam et al., 2000).

As research in this area continues to grow, more researchers need to explore the development of essentialist beliefs using more than one of these approaches within the same project, in order to provide stronger, converging evidence of essentialist thinking (e.g., Diesendruck, Birnbaum et al., 2013; del Rio & Strasser, 2011, are examples of recent research that has explored social essentialism using a variety of approaches). Doing so provides stronger evidence of essentialist thinking, and as the current research in NI has demonstrated, different approaches can reveal that all social categories are not essentialised equally along the same dimensions. The current research suggests that children in NI essentialise religion categories more strongly along the dimension of entitativity or cohesion, while gender is essentialised more strongly along the dimension of naturalness. If the present case study had focused only on exploring the development of social essentialism across childhood using inference tasks, the emerging picture would have suggested that children in NI essentialised ethno-religion categories and did not essentialise gender at all. Our adapted version of the Essentialism Components Questionnaire revealed that this was not the case; children endorsed essentialist beliefs about gender more strongly than they did about religion categories when we asked children to reason about the distinctiveness of these categories, and the discreteness and stability of category boundaries. However, the two approaches used in the current research need to be extended upon with future research in NI continuing to explore the development of social essentialism across childhood using other additional measures of essentialist thinking (e.g., the switched-at-birth task, transformation scenarios, and stability tasks) in order to provide more

converging evidence and a fuller picture of children's essentialist thinking about ethno-religion categories in NI.

Another criticism that might be made of the current research is that the findings may indicate that religion categories have strong inductive potential in NI, but this does not necessarily mean that children essentialise religion categories. Other research examining children's socio-cognitive development has found support for the theory that social categories can have strong inductive potential because members of certain groups are seen as being bound by loyalty and strong moral obligations to one another (i.e., Chalik & Rhodes, 2014; Rhodes, 2013; 2014; Rhodes & Chalik, 2013). For example, Chalik and Rhodes (2014) conducted experiments in which children were told about individual members of two groups – a red team and a blue team – coming into conflict with one another (e.g., one team member taking bricks from another team member in a competition to build a tower, or one child pushing another child in a situation involving no competition between groups), and they were asked to make inferences about future cross-group interactions between the two teams. Chalik and Rhodes found that 4 year old children expected others only to be friends with members of their own group following cross-group conflict, and they also predicted that members of the offending group would continue to commit offenses (e.g., stealing cookies) against members of the other group (but not members of their own group). Furthermore, Rhodes and Chalik (2013) also reported that 3-9 year old children judge anti-social behaviour between members of the same group more harshly than anti-social behaviour between members of different

groups – intergroup conflict was only judged to be wrong when children were told there was a rule against it.

Thus, Rhodes (2013) maintains that social essentialism is not the only naive theory that children might bring to bear on their developing concepts of social categories; they might also perceive social category membership as bestowing social obligations on all of its members, which could make certain social categories inductively powerful. This is an alternative view that could be taken of the inference data presented in the current research on religion categories in Northern Ireland. Given the extreme polarisation of people along ethno-religious lines in NI through tribal politics, expressions of culture, the split education system, and varying levels of residential segregation, it seems likely that children and adults would view religion categories as marking strong interpersonal obligations between members of the same groups (Gallagher, 2010; Gillespie, 2010; Gough et al., 1993; Nolan, 2014). It would also explain the weak inductive potential of gender categories in the present research if children take a more naturalized view of gender, but do not view members of the same gender groups as being particularly obligated to one another. Moreover, 6 year olds in the current research may have been more willing than older children to base inferences on shared membership of the control categories if they viewed ownership of a particular pet as conferring social obligations between pet owners. However, while this is an interesting aspect of children's naïve theories about social categories that future research should explore alongside social essentialism, there are some issues with this interpretation of the current data.

The first is that the current research did not only find that religion was an inductively powerful social dimension for children in NI. The ECQ study (Study 5) also showed that from 10 years of age, children attending segregated schools endorsed essentialist beliefs about the stability of religion group boundaries and the immutability of religion group membership more strongly than they did for the control category. Children attending integrated schools did not distinguish between religion and the control categories at any age in relation to the stability and immutability of group membership. This shows that membership of the categories *Catholic* and *Protestant* were viewed as informative by *de facto* segregated children in NI, as well as being seen as exclusive and unchangeable (although not as exclusive and unchangeable as gender).

The second issue is that the social obligations lay theory and the social essentialism lay theory predict different kinds of inferences on the basis of religion group membership. The social obligations perspective alone supports inferences about the behaviour of group members, not the psychological properties or preferences of group members (Rhodes, 2013). The social essentialism perspective supports the projection of psychological properties and preferences between group members on the basis that a common, underlying category essence confers greater within group similarity (Gelman, 2003; Haslam, 1998). The current inference studies employed novel properties that were presented to children in the form of personal attributes or psychological characteristics – for example, “this child is *gleeve*. Do you think this child (alternate picture) is also *gleeve*?”. Given the framing of the properties in this research as novel attributes, it seems unlikely that the

perception of religion categories as denoting interpersonal obligations would support the projection of these properties. If the properties had been framed as novel interpersonal behaviours, then this could indicate a bias for viewing religion group members as obligated towards one another. Therefore, this would suggest that children's category based inferences in the current research are supported by the perception of within group similarity, and thus can be taken as an index of children's essentialist reasoning about social categories. Future research should examine the effect that different types of properties might have on children's pattern of category based inferences in NI.

Additional limitations of the current case study might also be methodological in nature. One concern might be about how projectable the novel properties presented in the inference tasks were; as the properties consisted of novel attributes that children were not familiar with and had never used before, it is possible that children may not have interpreted the properties as legitimate attributes to be projected on the basis of category membership. The pattern of results observed both in Northern Ireland and in Boston (Study 4) suggest that children did not have any issues with projecting the novel attributes presented to them; children projected novel properties at a rate greater than chance level based on religion and control category memberships across two national contexts, and they each showed different patterns of inference using these properties. At 6 years of age children in NI and Boston both drew inferences based on religion and control category memberships at a similar rate and above chance level. Across childhood, children in NI increasingly distinguished between religion and the

control dimensions and chose to make more inferences based on religion group membership over time (within the segregated school sector). Meanwhile, children in Boston did not increasingly privilege religion categories as a basis for induction across childhood; they treated religion and the control categories as less informative across childhood, basing inferences on these categories at chance level by 10 years of age. If the novel properties were not projectable to children, all of their category based inferences would have been at chance level or below chance level, and different patterns of category based reasoning are unlikely to have been found between the two different national contexts.

Another criticism that might be made of the current research is that the control category employed was not interpreted as a blank, arbitrary dimension – particularly by the youngest children tested – in both NI and the US. In the current inference studies, the control category was often treated as a more informative social category then gender. While this was unexpected, the inclusion of the control dimension did still act as an interesting basis for comparison on examination of children's pattern of inference, and their responses to the ECQ. The inference studies showed NI children reasoning similarly about religion categories and the control categories at 6-7 years of age, and then at 8 years of age stronger essentialist reasoning about religion categories seemed to emerge with children drawing stronger religion-based inferences than control category based inferences, with the control dimension being treated as less informative across childhood. This suggested that religion categories and the control categories may be relatively unfamiliar, novel categories to children at

6 years of age, which may have made them an interesting basis for inference. Meanwhile, by 8 years of age, children may have more fully developed concepts of these social dimensions, and social and cultural input may have constrained their essentialist beliefs about religion and the control dimensions, affecting how useful each dimension was viewed as a basis for inference. This was supported by the pattern of inference found with the sample in Boston, in which children may have treated membership in religion and control categories as a strong basis for inference due to the novelty of these categories at 6 years of age, while across childhood they treated both social dimensions as increasingly less informative, perhaps because they also had more fully developed concepts of these social dimensions by 8-12 years of age, and social and cultural input about these categories may have led them to view these categories as relatively unimportant. Further to this, the findings from the ECQ study provided further insight into children's reasoning about religion, gender and the control dimension of pet ownership. NI children's responses to this questionnaire revealed that they did not endorse strong essentialist beliefs about the distinctiveness of pet ownership categories or the stability and immutability of pet ownership categories. In particular, the items measuring category stability showed that children viewed pet ownership categories as the most flexible and unstable social dimension, compared to religion and gender categories from 10 years of age (in the segregated school sector).

A final point to make on the potential limitations of the current research is that proponents of a primarily feature-based model of children's category-based induction might maintain that the labelling of categories and the visual

stimuli used in the current studies may have elicited the current pattern of inference among children in NI and Boston (see Sloutsky, 2003; Sloutsky & Lo, 1999; Sloutsky, Lo & Fisher, 2001; Godwin & Fisher, 2015). It is possible that perhaps the youngest children tested at 6-7 years of age in the current research may have relied on verbal labels and the visual stimuli to aid them in drawing inferences, however, it seems unlikely that children relied on perceptual features for the following reasons. Firstly, category labelling was not explicit in the current research; group memberships of religion and the control dimensions were presented to children as descriptions. For example, "this child goes to a Catholic Church and owns a hamster". Only gender was labelled explicitly (e.g., "this child is a boy"). Therefore, it seems unlikely that children relied on a label matching strategy in their responses, and if they had then it seems more likely that children would have drawn more inferences on the basis of gender group membership than based on membership of religion and the control categories. Secondly, the visual stimuli were manipulated between Studies 2 and 3 (which were both unconstrained inference tasks); in Study 2 only gender categories were presented visually in the pictures, while in Study 3 all three social dimensions were represented pictorially. Despite this, Studies 2 and 3 still revealed a similar pattern of results. Moreover, in Study 4, conducted in Boston, half the sample received full pictorial cues for all social dimensions, while half the sample received reduced pictorial cues only for gender, and no statistical difference was found between the two stimuli conditions. Thus, the pattern of inferences observed in the current studies cannot be attributable to the perceptual features (auditory labels or visual stimuli) of the task.

Having addressed the possible limitations of the present case study in Northern Ireland, the following section will discuss the questions raised for future research into the development of essentialist reasoning about religion categories in NI.

9.6.2. Questions for future research

The present case study of the development of children's essentialist reasoning about religion categories in NI constitutes a series of five studies that make an original contribution to the literature on social essentialism. This area of research has not previously been studied in NI, and so it contributes to the essentialism literature by expanding on what is known about the development of social essentialism across cultures, within a previously unexplored national and cultural context. Further to this, the current case study also makes a valuable contribution to understanding the development of children's knowledge and reasoning about the two dominant religion categories in NI, and the effect that different educational contexts may be having on children at a socio-cognitive level. Much of the developmental research concerned with religion categories in NI focuses on intergroup contact initiatives and changes in children's attitudes and feelings towards their perceived outgroup (Cairns & Dawes, 1996; Cairns, Wilson, Gallagher & Trew, 1995; Trew, 2004), as well as the negative impact that the legacy of the Troubles continues to have on intergroup relations and mental health (Cairns, 1987; Cairns & Darby, 1998; Cairns et al., 1995). The current research provides interesting evidence of how environmental input in NI constrains the development of essentialist reasoning about religion

categories, which may be one important cognitive basis of negative intergroup attitudes and emotions (see Diesendruck & Menahem, 2015 Segall et al. 2015). It also raises a number of questions for future research.

First of all, the current studies constitute a starting point for studying the development of social essentialism within Northern Ireland. Additional research is needed to replicate the current findings and expand on them by using additional converging measures of essentialist reasoning that were not included in the current research project. Future research also needs to extend the age range of participants tested. It would be interesting to examine the essentialist reasoning of 4-5 year old children in NI to find out if their reasoning is similar to the 6-7 year old children in NI, who we suspect may be drawn to making inferences on the basis of religion group membership and membership of the control categories because these may be relatively novel social dimensions to them, and cultural input has not yet exerted constraints on children's reasoning about religion categories at this age. Further to this, the age range examined should also be extended to include adolescent and adult participants so that the developmental course of essentialist reasoning about religion categories in NI can be charted across the lifespan. Variations between participants due to socio-economic status (SES) and the type of residential areas that participants may live in should also be taken into account. In the current research we could only obtain estimates of SES and level of community diversity using free school meals and ward information as indices. In future research, it would be preferable to ask parents for this information. As recruiting participants for this project proved challenging at times due to the topic of religion, we did not want to

ask parents for too much information when seeking parental consent for children to participate.

Secondly, future research also needs to investigate the mechanisms that transmit environmental messages about various social categories to children. The social essentialism literature has demonstrated that different social and cultural input about the importance of various social dimensions directs essentialist beliefs about these categories (i.e., Astuti et al., 2004; Chalik et al., 2017; Deeb et al., 2011; Diesendruck, Goldfein-Elbaz et al., 2013; Kinzler & Dautel, 2012; Mandalaywala & Rhodes, 2017; Rhodes & Gelman, 2009). However, the ways in which environmental input about social categories is transmitted to children has not yet been well researched, with the exception of a few studies that have begun examining the link between parental input (i.e., labelling, generic language) and essentialist reasoning about social categories (i.e., Mandalaywala & Rhodes, 2017; Rhodes et al., 2012; Segall et al., 2015). As well as mapping the development of essentialist beliefs about religion categories in NI across the lifespan, research should also explore how cultural input is transmitted to children and how much impact different modes of transmission have on constraining the development of essentialist thinking. The current research began to do this by exploring the impact of educational context on children's essentialist reasoning and found that children in the integrated and segregated sectors reason differently. Using meta-analysis, the current research ruled out level of community diversity in children's residential areas as producing the observed effects of educational context. However, it was beyond the scope of the current research to investigate parental input about

religion categories in NI and the mechanisms by which the different educational sectors come to influence children's essentialist beliefs.

As previously discussed, children attending integrated schools did not privilege religion group membership over membership of the control categories, while from 8 years of age children attending segregated schools did. This may have been because exposure to social diversity and intergroup contact within the integrated sector may have led integrated children to engage in de-categorization (see Prati et al., 2016), and thus perceive less variability between social groups and more variability within social groups, causing children to place less importance on religion group membership (see Turner et al., 2013). It may also be due to the integrated ethos of these schools establishing school norms of tolerance, respect and friendship towards all other children. If internalised, these norms might lead children to place less importance on membership of social categories. Alternatively, children attending integrated schools might be conforming to the norms of their school – as previous research on school norms has found (Nesdale, 2011) - and so choose not to endorse stronger essentialist beliefs about religion in comparison to the control category because they believe this would not be socially acceptable. Future research should investigate these possibilities by examining children's explicit and implicit (e.g., see the speeded time task used as an implicit measure in Eidson & Coley, 2014) endorsement of essentialist beliefs about religion categories under conditions of differing group and school norms (e.g., see Fitzroy & Rutland, 2010; Rutland et al., 2005), and different levels of accountability for their responses (e.g., accountability to school peers, teachers, neighbourhood peers and

parents). As well as this, investigators should also examine the possibility that children in NI do not only essentialise religion categories but may also hold an additional theory about the nature of religion categories in which they view religion group membership as dictating loyalty and moral obligations between group members (Chalik & Rhodes, 2014; Rhodes, 2013; 2014; Rhodes & Chalik, 2013). If children in NI reason about religion categories in both of these ways, research should ascertain to what extent each of these naïve theories are endorsed about religion (and other) categories, and also continue to collect cross-cultural data from other national contexts for comparison (perhaps from England and the Republic of Ireland).

Finally, a third avenue for future research to pursue is how the current research could be applied to form an intervention targeting the development of essentialist beliefs about religion categories across childhood. An interesting study would be to explicitly and implicitly measure the social essentialist beliefs of children and adolescents participating in the Shared Education Program (SEP) in Northern Ireland (see Hughes, 2014; Hughes, Lolliot, Hewstone, Schmid & Carlisle, 2012). The Shared Education Program is a contact initiative created to bring children together who attend separate schools in NI, due to the low percentage of the population that chooses the integrated sector (see Hughes & Donnelly, 2012). SEP aims to provide opportunities for contact that may be more successful than past schemes (e.g., EMU, Hughes & Donnelly, 2012) because it meets more of the optimal conditions for contact by having children work together towards a common goal – i.e., their GCSEs or other academic goals – rather than bringing children together with contact as the only goal. It would be interesting to find

out if children's level of essentialist thinking about religion categories changes after participation in Shared Education, and whether this is related to changes in their intergroup attitudes. If implicit essentialist beliefs were found to be related to children's intergroup attitudes in NI, this would suggest that interventions aimed at challenging the development of essentialist beliefs about religion from early childhood could be one route to improving intergroup attitudes between Catholic and Protestant children in NI. For example, research has found that extended contact and imagined contact can be effective in improving children's thoughts and feeling towards outgroups and towards cross-group contact (Cameron, Rutland, Turner, Holman-Nicolas & Powell, 2011; Cameron, Rutland, Hossain & Petley, 2011; Turner et al., 2013). If research was to find that indirect contact has an impact on social essentialist beliefs, this might be one way to achieve prejudice reduction through the use of story books about children engaging in cross-religion group contact in NI. At the very least it might help to prepare children for engaging in direct contact later in their school life. This could have a positive effect on determining successful outcomes for SEP in particular areas, as according to Hughes (2014) the program is not as successful in areas of NI that experienced high levels of conflict during the troubles and where tension between communities is still high. For example, Hughes reports that children living near peacelines in Belfast were more anxious about and resistant to participating in Shared Education than children living in rural areas. Children living near peacelines were not 'contact-ready' and the intervention did not help establish cross-group friendships or massively improve intergroup attitudes.

To summarise, the current section on recommendations for future research has identified three key areas for further examination: 1. Extending the age range and demographics of the participants taking part in research exploring social essentialism in NI, so that essentialist beliefs about religion categories can be fully mapped across the lifespan. 2. Investigating how essentialist beliefs about religion categories in NI are transmitted (i.e., parental input, community input, the differing social composition of the two education sectors, the ethos and norms of different schools), and which factors moderate the strength of children's social essentialist beliefs. 3. Exploring essentialist beliefs about religion categories as one potential cognitive mechanism leading to stereotyping and negative intergroup attitudes in NI, with the challenging of social essentialist thinking in NI offering one possible means of early intervention.

Having discussed the findings from the present case study in NI, and examined the limitations of the current work and considered directions for future research in this area, the next section will conclude this final chapter.

9.7. Conclusion

To summarise, this PhD thesis has presented a series of studies examining the association between educational context and the development of essentialist reasoning about religion categories across childhood in Northern Ireland. This series of studies constitutes an original case study of social essentialism within a previously unexplored cultural context. As such, it makes an original contribution both to the social essentialism literature and to

research examining intergroup contact and the impact the education system has on children's developing social-cognition in NI. As a starting point, the current research has found that essentialist beliefs about ethno-religion categories in NI emerge quite late in childhood at around 8 years of age. Further to this, attending a religiously homogeneous school may influence the emergence of essentialist thinking about religion categories at around 8 years of age, while attendance at an integrated school may prevent stronger essentialist beliefs about religion categories from emerging. Future research needs to examine whether educational context primarily influences children's essentialist reasoning about religion categories in NI, or whether it is their parents' essentialist reasoning and subsequent choice of school driving this effect.

In addition to this, it was discovered that children in NI appear to essentialise religion and gender categories in different ways; religion seems to be essentialised more strongly along the essentialist dimension of entitativity and gender seems to be more strongly essentialised along the essentialist dimension of naturalness. This highlights the need for using different indices to measure essentialist thinking, as not all categories are essentialised to the same degree or in the same way. A number of directions for future research have been identified from the current findings. There is more work to be done in mapping the developmental trajectory of social essentialism in NI across the lifespan, as well as in exploring the mechanisms by which social and cultural input come to constrain the development of social essentialism in NI and across other national contexts. The potential usefulness of the current findings in developing future

prejudice-reduction interventions in NI has also been highlighted. There is clearly room for a lot more research to be conducted within the field of social essentialism and within the Northern Ireland context. The present case study examining the possible effect of educational context on the development of social essentialism in NI offers a valuable contribution the field, which can be used as a starting point for future projects to build on.

Appendix 1

School of Psychology
Queen's University Belfast
David Keir Building
18-30 Malone Road
BELFAST BT9 5BP
Tel: 028 90975518
Fax: 028 90975486
psychology@qub.ac.uk
www.psych.qub.ac.uk

29 November 2011

Ms Kirsty Smyth
School of Psychology

Dear Ms Smyth

Full title of Study: The inductive potential of religion categories in Northern Ireland
PREC reference number: No 74-2011

Thank you for your response to our request for further information regarding the above mentioned research application.

I can confirm that ethical approval has been granted for your project by the School of Psychology Research Ethics Committee, on behalf of Queen's University Belfast.

Please note that the Participant Information sheet should include an appended statement confirming ethical approval.

It is the responsibility of the Chief Investigator to ensure that the research has been recorded on the University's Human Subjects Research Database otherwise it will not be covered by the University's indemnity insurance. This database can be found in the 'My Research' section of Queen's On-line.

Yours sincerely

IP D Darlis

Dr Ian Sneddon (Chair)
Psychology Research Ethics Committee

cc Dr Aidan Feeney

Appendix 2

School of Psychology
Queen's University Belfast
David Keir Building
18-30 Malone Road
BELFAST BT9 5BP
Tel: 028 90975518
Fax: 028 90975486
psychology@qub.ac.uk
www.psych.qub.ac.uk

9 May 2012

Ms Kirsty Smyth
School of Psychology

Dear Ms Smyth

Full title of Study: Children's essentialization of religious categories in Northern Ireland
PREC reference number: 28-2012

I write to advise you that the application for amendment to the previously approved application PREC No 28-2012, (as detailed in your letter to the Chair of 9 May 2012), has been approved by the School of Psychology Research Ethics Committee, on behalf of Queen's University Belfast.

It is the responsibility of the Chief Investigator to ensure that the research has been recorded on the University's Human Subjects Research Database otherwise it will not be covered by the University's indemnity insurance. This database can be found in the 'My Research' section of Queen's On-line.

Yours sincerely

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Dr Ian Sneddon (Chair)
Psychology Research Ethics Committee

Appendix 3

School of Psychology
Queen's University Belfast
David Keir Building
18-30 Malone Road
BELFAST BT9 5BP
Tel: 028 90975518
Fax: 028 90975486
psychology@qub.ac.uk
www.psych.qub.ac.uk

4 March 2013

Dr Aidan Feeney
School of Psychology

Dear Dr Feeney

Full title of Study: Children's inductions from social categories in Northern Ireland.
PREC reference number: No 4-2013

Thank you for your response to our request for further information regarding the above mentioned research application.

I can confirm that ethical approval has been granted for your project by the School of Psychology Research Ethics Committee, on behalf of Queen's University Belfast.

Please note that the Participant Information sheet should include an appended statement confirming ethical approval.

It is the responsibility of the Chief Investigator to ensure that the research has been recorded on the University's Human Subjects Research Database otherwise it will not be covered by the University's indemnity insurance. This database can be found in the 'My Research' section of Queen's On-line.

Yours sincerely

pp.

Dr Ian Sneddon (Chair)
Psychology Research Ethics Committee

cc Ms Kirsty Smyth

Appendix 4

School of Psychology
Queen's University Belfast
David Keir Building
18-30 Malone Road
BELFAST BT9 5BP
Tel: 028 90975518
Fax: 028 90975486
psychology@qub.ac.uk
www.psych.qub.ac.uk

8 October 2013

Dr Aidan Feeney
School of Psychology

Dear Dr Feeney

Full title of Study: Children's essentialist beliefs about social categories in Northern Ireland.
PREC reference number: 76-2013

Thank you for your response to our request for further information regarding the above mentioned research application.

I can confirm that ethical approval has been granted for your project by the School of Psychology Research Ethics Committee, on behalf of Queen's University Belfast.

Please note that the Participant Information sheet should include an appended statement confirming ethical approval.

It is the responsibility of the Chief Investigator to ensure that the research has been recorded on the University's Human Subjects Research Database otherwise it will not be covered by the University's indemnity insurance. This database can be found in the 'My Research' section of Queen's On-line.

Yours sincerely

Dr Ian Sneddon
Psychology Research Ethics Committee

cc Ms Kirsty Smyth

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